Chilton's

TRUCK & OFF-HIGHWAY INDUSTRIES

DECEMBER 1981

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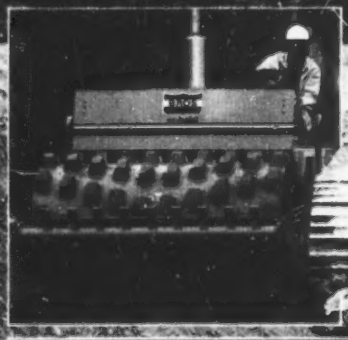

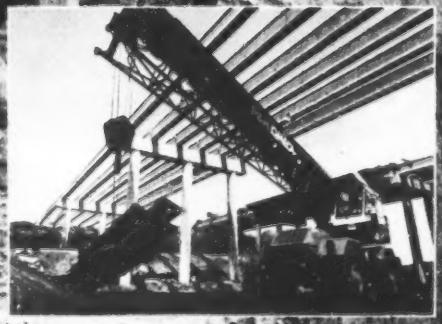

...HIGHWAY VEHICLE
...DUCATION ISSUE
...Year-End Wrap-Up

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Chilton's

December, 1981

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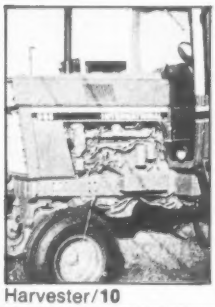

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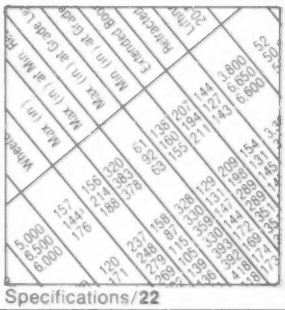

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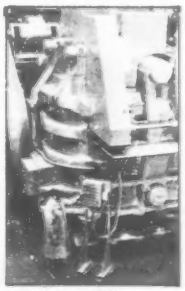

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TOHI's construction equipment forecast comes your way in January.

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'81 Frozen But... Industry Hopes For Earley Thaw In '82

Although business continues down for assemblers of trucks, farm machinery and construction equipment, all eyes are on trucks to lead the industry into a turnaround.

by John A. Stark

As we enter the winter season, business remains frozen for domestic assemblers of trucks, farm machinery and construction equipment. Everyone is hoping for an early thaw in '82.

That's the state of business through year-end, according to a very recent industry composite drawn by *TOHI* which is rooted to actual performance by manufacturers through September.

It's likely that 1981 factory shipments of medium and heavy-duty trucks will slip a modest 4½% to 226,500 units; retail sales of farm tractors and combines should drop 8½% to 174,900 vehicles; and factory shipments of construction equipment may decline 20% to 84,625 machines.

Due to the severity of last year's cyclical downturn in farm machinery and construction equipment business, *TOHI* has been monitoring monthly performance of the medium and heavy-duty commercial truck industry for early signs of a turnaround.

Commercial truck business is regarded as a reliable barometer of general economic conditions due to its shorter lead times at the factory of roughly three months, quickly reflecting movement at the marketplace.

By comparison, agricultural machinery demand trials the economy by six-eight months and construction equipment follows by 8-12 months, because of lengthy factory leads.

As of October, *TOHI* has yet to detect signs of a turnaround in medium- and heavy-duty truck business. However, this situation could change by the new year.

One of the largest producers of medium and heavy trucks in the nation, International Harvester, recently halted output of heavies for two weeks at Ft. Wayne, IN to lower vehicle stocks and offset soft demand at the marketplace.

Significance of this Harvester move is considerable. It tips the rest of the industry off to the fact that net incoming orders for heavy trucks continue to fall short of matching factory build rates. Until now, OEMs have forestalled big cutbacks in vehicle assembly by working off of sizeable vehicle order backlogs.

Yet, industrywide backlogs are dropping quickly. They've fallen by 25% since March to 30,000 units in September. Meanwhile, cancellation rates on decreasing gross orders jumped to 26%, the highest volatility in 15 months.

In the third quarter of '81, for example, daily truck builds slowed by 17% to 412 units; backlogs dropped by 11% to 30,000 orders; vehicle inventories decrease by just 7% to a 62-day supply of 24,100 units, as monthly retail sales flattened out at the 8100-vehicle level. But it failed to offset a compounded decline by 27% in gross monthly orders by September, to 8000 units.

Hence, it's probable that other high-volume (non-West Coast) manufacturers may follow the lead of Harvester and Mack by temporarily curtailing output of mid-size and heavy-duty trucks to balance the books.

It also indicates that year-end industry performance isn't likely to match 1980's big downturn to 237,406 vehicles (factory shipments). IH's R. J. Ratliff, senior vice president in the Truck Group; Ford's A. R. Kreuger, general sales & marketing manager in the Truck Operations; and GMC Truck & Coach Div.'s James Riley, general sales manager, said that they expect anywhere from a 12% increase in factory shipments of Class 6-7 trucks to a 18% downturn for these units by year-end.

Consequently, *TOHI* estimates '81 factory shipments of medium-duty trucks slipping by 3½% to 114,000 vehicles by the end of this month.

IH's Ratliff, Ford's Krueger and GMC's Riley anticipate declines in Class 8 truck demand this year ranging from 5% to 14½%. *TOHI* expects about a 6% downturn to 112,300 shipments in '81.

Just as domestic commercial truck business treks through a slippery two-year downturn, farm machinery business isn't anything to crow about either. Coming off a dismal '80 business, this year is shaping up just as bad.

When the spring selling season of March-April-May crumbled somewhat from the heavy axe of lower grain prices and high prime interest rates from the Federal Reserve Board, most producers of agricultural equipment expected a turnaround during the nation's fall harvest of September-October.

That's primarily why many OEMs entered the year's summer months with full production schedules at the factory and continual buildup of field inventories to record levels. They apparently planned to capitalize on a sudden burst in vehicle demand by fall.

Hence, industrywide inventory count mounted to 121,600 vehicles, nearly a year's supply of farm tractors and combines, as retail sales fell

'81 Frozen But...

to 116,760 vehicles by August. One month later, sales of most farm machinery tumbled by 35%. It reportedly caused deep concern about state of business throughout the industry. Several OEMs revised internal on-going 12-month forecasts downward considerably.

Recent factory closures ranging over two-week intervals at assemblers like John Deere (Dubuque, IA); Harvester (E. Moline, IL); J. I. Case (Racine, WI); Massey-Ferguson (Detroit, MI) and Allis-Chalmers (Independence, MO) indicate that industry producers are attempting to lower vehicle inventories to six-month levels. It clears the deck for entry of new farm machinery models during the spring selling season of '82.

Making matters worse, however, is the fact that this year's fall harvest reportedly failed to generate much demand for farm tractors, particularly high-horsepower two-wheel drives.

John Deere's N.O. Christenson, vice president of farm equipment & consumer products marketing-North America; Ford's H. J. Head, general operations manager-North America; and others told *TOHI* that they expect declines in demand for 2WD farm tractors ranging the gamut through 15%. *TOHI* projects a '81 downturn of 11½% to 137,400 units soon.

Steiger's D. D. Koentopf, president and CEO; Versatile's H. J. Hanley, vice president of marketing; John Deere's Christenson; and Ford's Head anticipate domestic retail sales of four-wheel-drive vehicles to finish the year with a tally of anywhere from 5% growth to a 17½% nosedive. *TOHI* projects 4WD sales will flatten out at 11,000 units. Combines may move ahead by 3% to roughly 26,500 machines.

Construction equipment isn't moving anywhere this year. A monthly vigil on retail sales of high-volume items like crawler tractors, crawler loaders, wheel loaders and industrial wheel tractors (machines that represent 75% of industry sales year-in and year-out) yields no hope for a turnaround soon.

The fact of the matter is that the construction equipment business is presently battling its worst cyclical downturn (three years so far) in history. It's feared that domestic markets could collapse soon, if they haven't already, under the heavy weight of the Reagan administration's drive to balance the budget, sharply curtailed federal outlays for highway and road construction and maintenance, and high prime interest rates from the Federal Reserve Board.

Demand for construction machinery overseas, however, is helping to offset sour domestic performance. It's widely believed throughout the

Construction Equipment Production Shutdowns at a Glance

MANUFACTURER	PLANT	PRODUCTS	ASSEMBLY SHUTDOWN
J.I. Case	Bentendorf, IA	CT, CL	12/24-2/1
	Burlington, IA	IWT	12/24-2/1
	Terre Haute, IN	WL	12/24-2/1
	Wausau, WI	HE, Cranes	12/24-2/1
	Wichita, KS	Trenchers	12/24/-2/1
Caterpillar	Aurora, IL	CT, CL, WL, HE, Skidders	10/5-10/12, 11/2-11/9 12/24-1/4
	Bentendorf, IA	CL	11/2-11/9, 12/24-1/4
	Decatur, IL	MG, OHT, WL	11/2-11/9, 12/24-1/4
	E. Peoria, IL	CT, CL, Pipelayers	12/24-1/4
	Joliet, IL	SC, CL	12/24-1/4
Clark	Benton Harbor, MI	WL	12/24-28, 12/31-1/4
John Deere	Dubuque, IA	CT, CL, IWT, WL, HE, SC, MG	12/24-2/1
Euclid	Cleveland, OH	OHT	12/24-1/4
Fiat-Allis	Springfield, IL	CT, CL, WL, MG	12/24-1/4
Int'l Harvester	Libertyville, IL	WL, SC	11/2-1/4
	Melrose Park, IL	CT, CL	11/2-1/4
Terex/IBH	Brooklyn, OH	SC, OHT	12/24-1/4
	Hudson, OH	CT, WL	

Legend: CT, Crawler Tractors; CL, Crawler Loaders; WL, Wheel Loaders; IWT, Industrial Wheel Tractors; HE, Hydraulic Excavators; OHT, Off-Highway Trucks; MG, Motor Graders; SC, Scrapers.

Note: All data based on a company-by-company check.

Domestic Farm Machinery Business Erodes in '81

	1980		1981	
	UNITS	DAILY SALES	UNITS	DAILY SALES
0-39 HP	46,800	190	42,000	171
40-99 HP	58,100	236	51,000	207
100 HP & more	50,300	205	44,400	180
All 2WDs	155,200	631	137,400	559
All 4WDs	10,900	44	11,000	48
Total Tractors	166,100	675	148,400	603
All Combines	25,700	105	26,500	108
Grand Total	191,800	780	174,900	711

Note: Unit count for 1981 are estimates based upon actual industry retail sales at domestic outlets through September. A revised yearly unit count will be issued in 1982.

Source: Truck & off-highway industries data.

Farm Machinery Production Shutdowns at a Glance

MANUFACTURER	PLANT	PRODUCTS	ASSEMBLY SHUTDOWN
Allis-Chalmers	W. Allis, WI	2WD, 4WD Tractors	12/24-1/4
	Independence, MO	Combines	10/5-10/19, 12/24-1/4
J.I. Case	Racine, WI	2WD, 4WD Tractors	12/24-2/1
John Deere	Dubuque, IA	2WD Tractors	12/24-2/1
	Waterloo, IA	2WD, 4WD Tractors	12/24-1/4
	E. Moline, IL	Combines	12/24-1/4
Ford	Romeo, MI	2WD Tractors	12/24-1/4
Int'l Harvester	Rock Island, IL	2WD, 4 WD Tractors	12/14-1/4
	E. Moline, IL	Combines	8/24-9/21, 12/14-1/4
Massey-Ferguson	Detroit, MI	2WD, 4WD Tractors	11/2-11/16, 12/24-1/4
Steiger	Fargo, ND*	4WD Tractors	8/31

Note: All data based on a company-by-company check.

*Most output halted due to a labor dispute.

Layoffs Mount in the Truck, Farm and Construction Machinery Businesses

	MARCH, 1981		JUNE, 1981		NOVEMBER, 1981	
	UAW LAYOFFS	% IDLE WORKFORCE	UAW LAYOFFS	% IDLE WORKFORCE	UAW LAYOFFS	% IDLE WORKFORCE
Allis-Chalmers	405	11%	405	11%	405	11%
J.I. Case	1400	19%	1400	19%	1400	23%
Caterpillar	4300	11%	4000	10%	2300	6%
John Deere	3400	11%	3500	11%	4100	15%
Euclid	150	25%	75	12½%	0	—
Fiat-Allis	66	4%	60	4%	55	4%
Int'l Harvester	8500	23%	8400	23%	10,000	28%
Mack	3200	28%	1400	12%	2250	29%
Massey-Ferguson	2600	35%	1900	27½%	1500	23%
Terex/IBH	375	17%	375	17%	310	17%

Note: All data based on a company-by-company check

Domestic Medium and Heavy Truck Business Remains Flat

	CLASS 6		CLASS 7		CLASS 8	
	1980	1981	1980	1981	1980	1981
Chevrolet	17,754	19,900	482	—	2,166	1,900
Chrysler	2,110	400	751	675	168	—
Ford	11,748	11,500	36,900	28,000	15,572	11,900
Freightliner	—	—	—	—	9,865	9,000
GMC Truck & Coach	22,199	21,200	2,172	875	17,021	14,200
Int'l Harvester	8,029	12,100	15,210	18,100	23,395	30,000
Kenworth	—	—	—	—	10,669	11,600
Mack	—	—	—	—	24,618	19,800
Mercedes-Benz	591	1,000	55	450	—	—
Peterbilt	—	—	—	—	6,987	7,300
Volvo White	—	—	—	—	6,853	4,500
Others	20	—	5	—	2,066	2,100
Total	62,451	66,100	55,575	48,100	119,380	112,300

Note: Unit count for 1981 represents estimates based upon actual factory sales through August. A revised yearly unit count will be issued in 1982.

Source: Motor Vehicle Manufacturers' Assn.; TOHI estimates

Domestic Production of Construction Equipment Plummets in '81 (Units)

	1980			1981		
TYPE OF EQUIPMENT	FACTORY SHIPMENTS	RETAIL SALES	U.S. EXPORTS	FACTORY SHIPMENTS	RETAIL SALES	U.S. EXPORTS
Crawler Tractors	18,550	11,500	7,050	15,700	9,500	6,200
Crawler Loaders	4,600	3,400	1,200	3,760	2,800	960
Wheel Loaders	16,580	11,000	5,580	12,750	8,000	4,750
Scrapers	4,900	3,100	1,800	3,500	1,900	1,600
Motor Graders	9,580	5,000	4,580	7,400	3,700	3,700
Rear Dump Trucks	2,470	1,300	1,170	1,925	925	1,000
Log Skidders	3,900	2,900	1,000	2,950	2,200	750
Trenchers/Ditchers	10,350	7,800	2,550	8,240	6,200	2,040
Ind. Wheel Tractors	30,300	27,100	3,200	24,500	22,000	2,500
Hydraulic Excavators	4,400	2,400	2,000	3,900	2,200	1,700
Total	105,630	75,500	30,130	84,625	59,425	25,200

Note: Unit count for 1981 are estimates based upon actual domestic industry performance through September. A revised count for 1981 will be issued in 1982.

Source: Truck & off-highway industries data

industry that it's sharp international demand for equipment that is helping OEMs like Caterpillar, IH, Fiat-Allis, Terex/IBH and Euclid maintain healthy production schedules.

Just recently, though, assemblers like Cat, Case, Deere and Harvester temporarily halted output throughout the US to more properly balance net incoming orders for construction equipment with build rates at the factory.

Caterpillar, for example, indefinitely idled 6% of its United Auto Workers workforce through September. Deere and Terex/IBH trailed close behind with 15% and 17%, respectively. J. I. Case and Massey-Ferguson followed with 23%.

This indicates that excessive amounts of light construction and industrial equipment still exist in the industry's pipeline which, in turn, reflects extremely low demand for vehicles at the marketplace. A nine-month count of domestic retail sales substantiates it.

IH's J. E. Monge, vice president-marketing, Equipment Group-North America; Deere's C. B. Reynolds, vice president-marketing, Industrial Equipment Div.; and Terex/IBH's D. B. MacLaren, director of marketing, North & South America foresee anywhere from a 10% to 20% drop in retail sales for crawler tractors, crawler loaders and wheel loaders. Industrial wheel tractors are pegged for a 20% decline.

We project retail sales of crawler tractors at 9500 units for 1981, a 17½% plummet; crawler loaders should dive another 17½% to 2800 vehicles; wheel loaders are likely to decline by 18% to 8000 units; and industrial wheel tractors could finish the business year slumping 19% to 22,000 machines.

For roadbuilding-type machinery and heavy surface mining equipment, IH's Monge, Deere's Reynolds and Terex/IBH's MacLaren envision anywhere from a 20% to 40% drop in sales of scrapers, hydraulic excavators, motor graders and log skidders. Euclid's R. E. Keidel, vice president-marketing, expects rear dump truck sales to decline by 29%. ■

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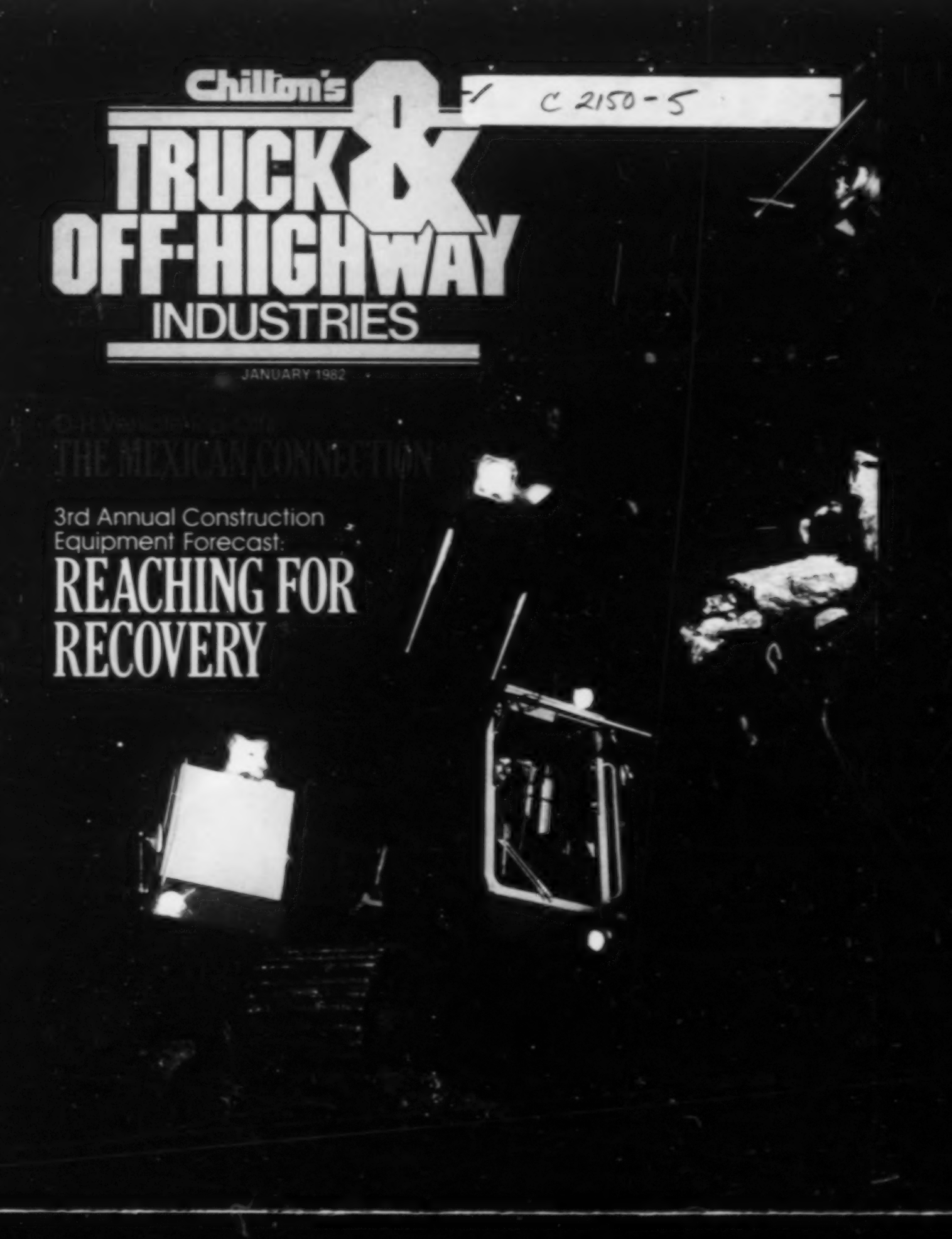
TRUCK & OFF-HIGHWAY INDUSTRIES

JANUARY 1982

THE MEXICAN CONNECTION

3rd Annual Construction Equipment Forecast:

REACHING FOR RECOVERY



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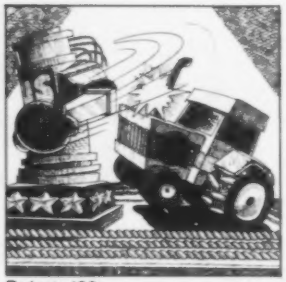

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COVER

The CE industry is reaching into 1982 for signs of recovery. Photo courtesy SKF Steel

NEXT ISSUE

The latest technology in turbocharging for over-the-road diesels, the ins and outs of aftercooling and a look at seating design come your way.

abc

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swing towards conventional units and away from cabovers, in one degree or another.

This changing federal regulatory environment is affecting on-going heavy truck programs like GMC's plastic truck. "Although we're proceeding with our 1½-year-old tests of five trucks equipped with fiber reinforced plastic [FRP] cabs," says Truxell, "we won't be making any decision to manufacture the cabs until this truck length issue is ironed out."

As a result, heavy truck cab production hangs in limbo at GMC. "All things considered," Truxell adds, "FRP is the way to go—less energy consumption and more parts consolidation in the manufacturing process." ■

Key Indicators

Selected Construction Equip., Producers' Shipments, 2nd Quarter* $1,246,532,000

— Units —	Oct. '81	Oct. '80	Year to Date 1981	Year to Date 1980
New Housing Starts (Actual)	86,200	152,700	959,900	1,083,400
US Total Truck Factory Sales (Classes 3-8)	18,853	22,748	198,229	213,352
US New Car Production	534,068	667,609	5,486,004	5,344,473
Farm Machinery, US / Retail Sales				
2wd Farm Tractors, Over 40 hp	10,725	13,718	80,808	94,860
4wd Farm Tractors, Total	882	1,666	8,020	8,943
Self-Propelled Combines	5,593	5,855	21,446	21,589

Construction, Mining & Materials-Handling Equip. Manufacturing**	Oct. '81	Sept. '81	Year to Date '81	Year to Date '80
New Orders	$ 3.0	$ 3.3	$ 35.6	$ 29.5
Shipments	3.3	3.3	33.4	29.6
Inventories	9.4	9.2	—	—
Unfilled Orders	11.0	11.3	—	—
Manufacturers Value of Shipments**				
Primary Metals, Total	$ 11.0	$ 11.6	$118.7	$111.8
Steel	5.7	5.9	60.9	51.2
Nonferrous Metal	4.3	4.6	46.4	49.6
Nonelectrical Machinery Equip. Industries, Total	16.9	17.3	170.0	150.9
Engines & Turbines	1.3	1.4	13.7	11.4
Farm Machinery & Equip.	1.1	1.3	12.8	11.6
Metalworking Machinery	1.0	1.0	9.8	9.1
General Industrial Machinery	1.4	1.4	14.3	13.3
Transportation Equip. Industry, Total	17.3	18.9	185.8	156.4
Motor Vehicle & Parts	10.7	11.9	117.8	93.4
Fluid Power Equip. (Index 1972 = 100)	279.0	288.0	—	—
Machine Tools***				
Net New Orders	$ .2	$ .1	$ 2.5	$ 4.0
Shipments	.4	.4	4.1	3.8

*Seasonally adjusted, includes off-highway wheel tractors, mixers, pavers, wheel loaders, scrapers, graders, rollers, off-highway equip., and mountings.
**Billions of dollars, seasonally adjusted monthly total (unless otherwise noted).
***Cutting and forming, domestic and foreign.

Sources: US Dept. of Commerce, Individual Motor Vehicle Mfgrs., National Fluid Power Assn., NMTBA, FIEI, TOHI.

Tomorrow's Factory Today

by John Forwalter

The factory of tomorrow is taking shape now in both automotive and truck & off-highway assembly plants. Chrysler's St. Louis plant is a case in point—Chrysler has put a lot of effort into turning it into a highly-automated operation. And the systems installed there may serve as an example of what could be done in heavy-duty manufacturing facilities.

St. Louis includes a control system that allows data transmission from machine to machine. System controllers—computers, minicomputers, numerical control systems, programmable controllers and mini-PCs—are linked to the plant's data highway.

This highway in turn can be linked to 64 stations through a main trunkline. This decentralizes control by distributing it throughout the network. The system ties together product assembly, management information services, materials handling, quality inspection, process control, production reporting, product testing and energy management.

Some off-highway manufacturers have already picked up on the state-of-the-art in automated manufacturing. One example is the Ingersoll transfer line at Caterpillar's Mentor, OH forklift truck manufacturing facility. The line operation is guided by a programmable controller supplied by Allen-Bradley.

Onan Corp. has turned to the use of PLC programmable controllers in the production of its new two-, three-, four- and six-cylinder diesel engines. The system, installed at its Huntsville, AL site, has upped production capacity to 16,000 J-series engines annually. ■

Case Debuts Uni-Loader

J.I. Case Co. of Racine, WI has unveiled its new 1816C Series Uni-Loader skid steer loader. The C Series sports a twin cylinder engine (replacing the single cylinder engine used in the previous B Series) with an SAE hp rating of 16.

The engine is a 43.3-in.^{3} (710-cm^3) Onan air-cooled gasoline model equipped with an electric fuel pump. It features a pressurized lubrication system. To help protect the engine, standard equipment includes an engine hourmeter, hydraulic oil filter condition indicator and low oil pressure buzzer.

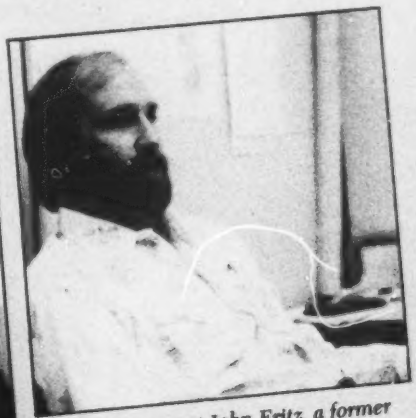
The 1816C is specially designed for maneuverability in restricted work areas. It is 35 in. wide (889 mm) with

(Continued)

O-H VEHICLE RIP-OFFS:

THE MEXICAN CO

This is the story of multi-million dollar off-highway vehicle theft and those Americans who steal and deal with Mexicans; of cash buys and cash bribes; of drugs and corruption. The rip-offs may be unstoppable because nobody seems to give a damn. A team of Chilton editors takes an inside look at the Mexican Connection.



US Customs agent John Fritz, a former member of the White House Secret Service detail, says lack of manpower makes it difficult to investigate suspected smuggling cases.

A young Mexican attempts to hide from the TOHI editorial team photographing this equipment on display behind a barbed wire fence. Most Mexicans working in the US don't want their picture taken for many reasons.

NNECTION

Veteran Texas State Policeman Edward Saunders says $4-5 million a week in stolen heavy construction equipment passes through Texas enroute to Mexico and Latin America.

P & H Omega, American and FMC equipment can be seen on this lot located near the Port of Brownsville. Investigators say smugglers are now dealing in narcotics instead of cash to complete a sale.

by Neil Regeimbal,
photos by Carl Glines

Brownsville, TX, the Rio Grande border town that's more Mexican than American, is the smuggling capital of the nation according to informed government investigators. Brownsville is the funnel through which hundreds of millions of dollars of expensive off-highway construction equipment, both new and used, is pouring into Mexico and heading for points South such as Panama, El Salvador and other Latin American countries.

A six month investigation by a team of *TOHI* editors reveals that at least 40% of the equipment being exported to Mexico was stolen from construction sites or franchised equipment dealers scattered throughout the 48 states. Included are everything from front-end loaders to the biggest dump trucks made in the US.

Informed sources within the Texas Department of Public Safety (the state police) conservatively estimate that between $4 and $5 million a week in stolen off-highway construction equipment is passing through Texas right now. And 60-80% is eventually trucked through Brownsville, Laredo, or nearby Roma, across the Rio Grande River and into Mexico, according to export figures compiled by the US Census Bureau. The figure comes to a staggering $250 million a year. Some experts say that's a low estimate.

The bottom line is that US equipment manufacturers are losing sales and profits both in this country and in Latin America. Contractors who have been ripped off are slow to replace the stolen equipment due to time and money constraints. And the stolen equipment replaces orders for new machinery, according to Brian Deery of the crime prevention committee of the Associated General Contractors of America.

Meanwhile, fortunes are being made almost overnight in fencing and smuggling construction vehicles. Little or nothing is being done to shut off the flow because of a serious lack of federal and Texas police manpower.

The result is that nobody is being arrested, no indictments are being sought, no grand jury investigations are underway and there have been no recent convictions in this bizarre never-never land that marks the region around the US and Mexican border.

During the last week of October, *TOHI* investigating editors found so much construction equipment sitting in Brownsville waiting for Latin American buyers that they gave up trying to inventory all of it. There just wasn't time.

"The US Bureau of Roads could rebuild half the country's interstate system with all the construction equipment we've got sitting here in Brownsville," claims a 23-year veteran investigator for the US Customs Department.

The reason behind the unprecedented traffic in stolen equipment is Mexico's exploding economy and the mad, headlong rush by that country into industrial and agricultural development.

That kind of vast, multi-billion dollar industrial development requires millions of dollars in heavy construction equipment which is just not available, legally, inside Mexico. In fact, the only place that equipment is available is in the US.

According to Edward Saunders, a 25-year veteran of the Texas State Police specializing in stolen equipment, "Most of the lots where the equipment is openly sold or traded for narcotics didn't exist before 1977."

Perhaps the key reason why Mexico demanded that the US State Department exempt construction equipment from reciprocity under a new treaty

dealing with the return of stolen equipment is that many Mexican officials in key government positions are suspected of being major dealers in this equipment—on both sides of the border. That treaty is still to be ratified by the US Senate.

One such alleged dealer is the former governor of the state of Tamaulipas, Enrique Cardenas Gonzales. Gonzales operates a used truck and construction equipment export business near McAllen, TX (about 40 miles north of Matamorus, Mexico). Texas law enforcement officials have named him as having taken into Mexico an expensive mobile camper that had been reported stolen in Colorado. Gonzales offered to pay for the stolen camper. State police claim Gonzales uses his influence with other Mexican officials to help "ease" the way for construction equipment to be trucked into Mexico.

Saunders says most of the people who are in the business of selling construction equipment in the Brownsville area deal in stolen merchandise, and they are being financed by other Mexicans whose one objective is to get rich at the expense of "gringo" contractors and insurance companies.

"That's where the demand is and that's where the money is—in Mexico," says Saunders.

It's doubtful if Saunders or John Fritz, a 33-year-old special Customs agent in Brownsville, could stop the flow of hot equipment to Mexico even if they had the necessary manpower to try.

There is no "paper" trail on construction equipment. The only records on vehicle registrations are kept by the manufacturer and they only know the original buyer. "This kind of equipment passes through so many hands it's impossible to keep track of it," claims Saunders. "It may be rented or leased to a half dozen construction companies before it's stolen or disappears. And that usually happens on a Friday night or just before a long weekend so that by the time the theft is discovered, the equipment is already in Mexico.

"These people often steal on demand. A Mexican buyer will place his order for a certain type bulldozer, or backhoe or front-end loader, and within a matter of days that particular piece of equipment is successfully spotted and stolen, the necessary export documents prepared and it is trucked across the border where it is gone forever," says Saunders. Thefts valued at $200,000 or $300,000 are common.

"The only way we can stop that equipment from crossing into Mexico is if we get sufficient notice from police of the theft," says Saunders, "and if we're lucky enough to spot it moving on the highway before it passes through Mexican Customs. But if the serial numbers have been changed, there is nothing we can do. By the time we try to identify the piece of equipment with the OEM, it's too late."

Customs officers tell of the time they spotted a big bulldozer, that they knew was stolen, on a railroad flatcar headed for Mexico. They couldn't get an ownership record in sufficient time so they had to let it go.

Still another reason so much heavy construction equipment is going to Mexico illegally is that US Customs has a limited interest in what leaves the country.

THE CHASE

It had all the elements of a "Starsky and Hutch" chase scene, but it was no TV drama—this chase was for real.

It began about 3 pm at a used heavy equipment lot on Routes 77/83, a few miles north of Brownsville, TX. It ended almost an hour later in the parking lot of 700 Paredes Avenue in Brownsville, home of the local US Customs Service Office of Investigations, and regional offices of the Texas Organized Crime Strike Force and Texas Comptrollers office.

It wasn't much fun.

We (*TOHI* reporter Neil Regeimbal and Chilton writer/photographer Carl Glines) had spent the day with special customs agent John Fritz photographing scores of heavy equipment lots that dot almost every block in Brownsville and the surrounding area—equipment destined for Mexico and countries south.

Fritz had left us for other work, and as we drove back to our hotel, we decided to rephotograph one lot. Glines, standing on the side of the highway, began photographing the lot and two men. One, a husky man of obvious Mexican descent, became visibly angry and ran for a car, shouting, "What do you think you're doing?"

We left as fast as a tired rental car would permit—not quite the way TV cars roar away with smoking tires.

In only a couple of minutes, we could see a yellow convertible with red body plastic around the grille following in hot pursuit. It was the burly Mexican and he wasn't hampered by a rental car.

We moved to the left lane and considered turning into our hotel when we reached that point on the flat, divided highway. The angry Mexican pulled alongside on the right, his face almost burgundy with rage.

"You'll hear from me. I have your number!" he screeched.

We decided against the hotel and instead kept on down the highway at a flat-out 75-80 mph. Our pursuer kept on our bumper.

As we approached a series of hills in the road, our pursuer peeled off onto the shoulder, sliding on the wet grass and mud. He appeared to have given up the chase.

We took advantage of his maneuver and turned off into San Benito, down a major road, and a few blocks later into a series of side streets. We pulled up to a street with a view of the main road. Just the nose of the rental car showed and we saw the Mexican on the main street.

Unfortunately, he saw us too. The chase was on again.

We ducked down a couple of streets, ending up in front of an elementary school which was just closing. The street was full of kids and mothers in their cars. We were blocked.

Our pursuer came up behind, got out of his convertible, and began banging on our locked doors. When the road cleared of nervous mothers and curious children, we pulled away slowly—there was no place to hide.

He came alongside again and again, demanding we stop. The crazy pursuit went back on the freeway towards Brownsville.

As we neared his equipment lot, he sped past us, pulled over to the grassy shoulder and began signaling. We kept going, convinced now that we'd better get help.

As we approached the turnoff to the Customs office, a silver and blue pickup came roaring up behind, and we were boxed in.

The Mexican with folded arms answers questions from Brownsville police after he and a companion chase the TOHI *editorial team over 40 miles of highway.*

At a stop sign just in front of the 700 building we were able to turn quickly into the parking lot.

The convertible locked its brakes, slammed into reverse, and with tires squealing, pulled in behind us. The pickup came in the other way and we were now stopped bumper-to-bumper, front and rear.

Employees leaving work in the small parking lot looked with amazement as Regeimbal went to get agent Fritz, and Glines reloaded his camera to record this bizarre scene.

Within minutes, three patrol cars screamed in the parking lot.

Fritz explained to the police that we were journalists on a job. The Mexican wanted the film and wanted us locked up. Police finally told him they would make a "situation report." At Fritz's urging, police told the two Mexicans not to harass us for the rest of our stay.

We quickly arranged to change rental cars at our hotel. They had one standing by, but it turned out to be the same color and body style.

We headed for the hotel bar.

Postscript: The following day investigator Edward D. Saunders of the Motor Vehicle Theft Service of the Texas Department of Public Safety told us that he had seized several pieces of stolen heavy equipment from that lot in the past, but had never been able to make a case against the apparent operator, our irate Mexican pursuer. ■

"We are primarily concerned with what comes into the country," says Fritz, a former Secret Service agent once assigned to the White House detail. "And you can bet the Mexicans aren't bringing bulldozers into the US."

To take a piece of equipment out of the country, all that's required is a Shippers Export Declaration (SED) listing the equipment and its value.

In fact, most exporters print their own SED forms and use children as runners to carry the form from the truck driver to the Customs inspector. Because there may be 100 or more tractor-trailers going into Mexico from Brownsville in a single day, it's impossible for Customs to check all the SEDs for accuracy.

When it comes to importing construction equipment, Mexican Customs apparently isn't asking any questions these days. Any problems with the Mexican bureaucracy can nearly always be solved with a bribe.

Mexicans call it "mordia," and taking mordia is said to be an accepted way of life for Mexican officials in every position.

Much of the big equipment that eventually is trucked into Mexico by Mexicans can be seen on the many equipment lots scattered over South Texas. The lots are as big as five acres or as small as a quarter acre.

Here, in portable trailer homes or unpainted plywood shacks that are thrown up overnight, Mexican buyers make most of their deals for construction equipment.

While some of the equipment on display is always obtained legally to lend a degree of legitimacy to the operations, most of it has been stolen, Saunders says.

To the *TOHI* editors, some of the equipment appeared to have been cleaned and repainted, but most of it still showed signs of being recently used.

"A used Cat D8 bulldozer brings $200,000 and a D9 $225,000," claims Fritz. "The popular Case 580C backhoe is selling for $38,500. Mexican buyers are willing to pay high prices for stolen equipment because they can't get it elsewhere. In Mexico, prices range from 60% over US retail value; father south in Panama, it's up 240%.

"The Mexican government helps promote the problem because it often allows this machinery to come into the country classified as agricultural equipment, which under Mexican law is now duty free."

Even when it is classified as construction equipment and declared more than four years old, there is no duty. There is almost no way Mexican Customs can determine the age of a bulldozer or road scraper, so it almost always comes in duty free.

US government figures show that between 1978 and 1980 exports of used or rebuilt heavy construction equipment into Mexico increased between 100% and 400% (the latter for excavators).

Fritz says the traffic in stolen construction equipment will continue to grow until somebody starts screaming loudly. "Until that happens, nothing will be done to stop it. Government pressure is the only way to end it and that pressure just isn't there right now."

California Highway Patrol officer Gene Rutledge, chairman of the Heavy Equipment Committee of the International Association of Auto Theft Investigators, has compiled some astounding numbers. In a report dated Feb. 12,

1981, Rutledge claims that 11,832 pieces of construction equipment were reported stolen and not recovered nationwide in the year ending September 1980. That figure is 18% higher than the year previous. The average loss per contractor from heavy equipment theft now amounts to more than $10,000 a year.

This stretch of road in the heavy industrialized section of Matamoros, Mexico is almost always congested with tractor-trailers loaded with either smuggled construction equipment or rolled steel destined for the Mexican interior.

The Robbers' Top Ten

Makes and models of the most frequently stolen pieces of construction equipment as reported to the FBI's National Crime Information Center

	MODEL	VALUE
1. CASE Backhoe	580C	$ 38,000
2. FORD Loader	445	25,000
3. JOHN DEERE Bulldozer	JD750	85,000
4. MASSEY-FERGUSON Loader Backhoe	MF40	30,000
5. CATERPILLAR Track Loader	977	141,000
6. CATERPILLAR Wheel Loader	966	132,000
7. JOHN DEERE Backhoe	JD410	38,000
8. CATERPILLAR Bulldozer	D-8	235,000
9. FORD Backhoe	555	40,000
10. CLARK Forklift	IT-60	32,000

source: W. E. Rutledge, California Highway Patrol's International Association of Auto Theft Investigators

Texas led the list with 2130 construction vehicles stolen. California was second with 1718. Illinois and Ohio also reported significant numbers of thefts.

These statistics were compiled from known thefts. Hundreds, perhaps thousands more may go unreported by unsophisticated rural police departments.

The traffic in stolen construction vehicles has become so immense, profitable and safe that the traffickers have stopped buying and selling equipment for money—they are trading bulldozers and road scrapers for heroin and other drugs, Saunders claims.

"When you start dealing in narcotics in Mexico, you're dealing with the 'Big Boys'," Saunders says. "This is not penny-ante action." The activity is definitely organized and is being run by what police believe is the Mexican equivalent of the Mafia. ■

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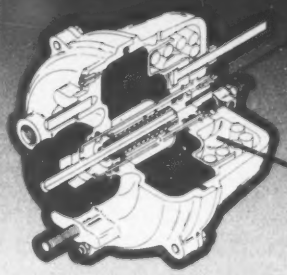

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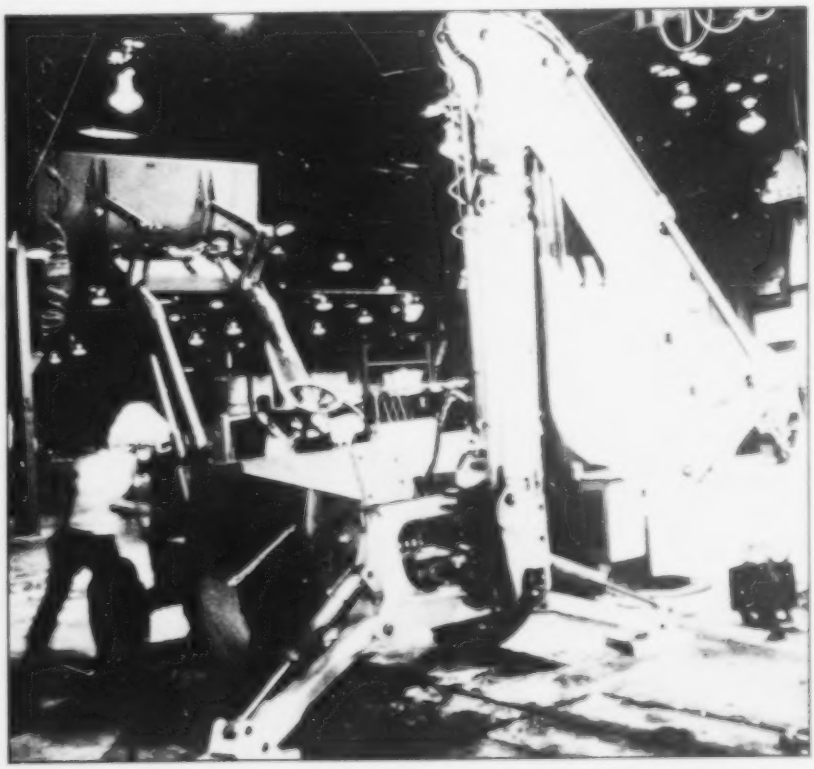
Reaching For Recovery

The slump in shipments from domestic construction equipment factories is likely to end late in '82, with full recovery expected by '83.



Internal construction OEM outlooks for this year indicate that actual domestic factory shipments probably will move ahead by 4½% to 106,120 vehicles, before posting a substantial turnaround in '83.

by John A. Stark

A scary four-year drop in demand for capital-intensive construction equipment is bottoming out as extremely high interest rates from the Federal Reserve Board ease to 15%. This is spurring a turnaround in housing starts and quickening the turnover of housing related off-road machinery.

An exclusive forecast developed by *Truck & Off-Highway Industries* shows factory shipments of equipment from US production plants will flatten out this year at about 106,120 units, a 4½% increase over a poor 1981 performance.

Domestic demand for machinery evaporated last year. Deliveries shrank 17½% overall, dragged down by a 19% drop in retail sales. It was preceded by a larger 25% recession in 1980. Business started its four-year slide with an 8% overall decline in '79.

A close look at prospective business by domestic producers of construction machinery this year shows that retail sales may advance 4½% to 77,690 units while exports could post a similar hike to 28,430 vehicles.

Although an advance of 4½% overall is foreseen for the entire calendar year, recovery isn't likely to jell throughout the industry until later this year. A widespread rebound is expected by '83.

Yet most construction OEMs aren't waiting for the free marketplace to turn itself around. They currently are attempting to spike demand for equipment by discounting list prices and offering exceptionally low unit financing terms.

Caterpillar, the largest retailer of construction machinery, reportedly now provides retail financing through the company's credit corporation for the first time in its history. Certain dealer outlets in the US are supposedly offering low term financing at 12% for 18 months on some slow selling, light-duty crawlers.

J.I. Case, the second largest marketer of construction equipment in the US, is offering in-house lines of credit for small off-highway vehicles as low as 10%. Komatsu, the second biggest seller of off-road vehicles in the world, offers low term financing in the US, too.

Just about all major manufacturers, including International Harvester, are directly rebating portions of equipment list prices as well. It's reported that IH is discounting up

WHEEL LOADERS

	1981		1980		1979	
	UNITS	% TOTAL	UNITS	% TOTAL	UNITS	% TOTAL
79 HP & BELOW	700	8%	880	8%	2230	13½%
80-99 HP	1500	17%	1870	17%	2640	16%
100-119 HP	2200	25%	2695	24½%	3380	20½%
120-149 HP	1900	21½%	2420	22%	3220	19½%
150-249 HP	1200	13½%	1430	13%	2475	15%
250-299 HP	575	6½%	660	6%	990	5%
300-399 HP	550	6%	660	6%	1160	7%
400 HP & OVER	215	2½%	385	3½%	405	2½%
TOTAL	8840	100%	11,000	100%	16,500	100%

NOTE: UNIT COUNT REPRESENTS US RETAIL SALES BY CALENDAR YEAR. ESTIMATES FOR 1981 INCLUDE ACTUAL INDUSTRY PERFORMANCE THROUGH SEPTEMBER.
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

INDUSTRIAL WHEEL TRACTORS

	1981		1980		1979	
	UNITS	% TOTAL	UNITS	% TOTAL	UNITS	% TOTAL
49 HP & BELOW	4,700	22%	6,320	23%	13,500	30%
50-59 HP	11,600	54½%	13,960	51½%	21,150	47%
60-69 HP	2,600	12%	3,730	14%	5,625	12½%
70-79 HP	1,400	6½%	1,380	5%	2,475	5½%
80 HP & OVER	1,000	5%	1,720	6½%	2,250	5%
TOTAL	21,300	100%	27,110	100%	45,000	100%

NOTE: UNIT COUNT REPRESENTS US RETAIL SALES BY CALENDAR YEAR. ESTIMATES FOR 1981 INCLUDE ACTUAL INDUSTRY PERFORMANCE THROUGH SEPTEMBER.
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

CE Business Up Slightly In '82

TYPE OF EQUIPMENT	1982 FACTORY SHIPMENTS	1982 RETAIL SALES	1982 US EXPORTS	1981 FACTORY SHIPMENTS	1981 RETAIL SALES	1981 US EXPORTS	1980 FACTORY SHIPMENTS	1980 RETAIL SALES	1980 US EXPORTS
CRAWLER TRACTORS	17,050	10,660	6,390	16,550	10,350	6,200	18,550	11,500	7,050
CRAWLER LOADERS	3,800	2,800	1,000	3,660	2,700	960	4,600	3,400	1,200
WHEEL LOADERS	14,740	9,240	5,500	14,110	8,840	5,270	16,580	11,000	5,580
IND. WHEEL TRACTORS	25,090	22,400	2,690	23,800	21,300	2,500	30,300	27,100	3,200
SKID STEER LOADERS	16,280	14,700	1,580	15,500	14,000	1,500	17,460	16,050	1,410
TRENCHERS/DITCHERS	8,570	6,450	2,120	8,240	6,200	2,040	10,350	7,800	2,550
MOTOR GRADERS	7,600	3,800	3,800	7,400	3,700	3,700	9,580	5,000	4,580
SCRAPERS	3,770	2,050	1,720	3,500	1,900	1,600	4,900	3,100	1,800
REAR DUMP TRUCKS	2,060	990	1,070	1,925	925	1,000	2,470	1,300	1,170
LOG SKIDDERS	3,090	2,300	790	2,950	2,200	750	3,900	2,900	1,000
HYDRAULIC EXCAVATORS	4,070	2,300	1,770	3,900	2,200	1,700	4,400	2,400	2,000
TOTAL	106,120	77,690	28,430	101,535	74,315	27,220	123,090	91,550	31,540

NOTE: UNIT COUNT FOR 1981 ARE ESTIMATES BASED UPON ACTUAL DOMESTIC INDUSTRY PERFORMANCE THROUGH SEPTEMBER. A REVISED FORECAST FOR 1982 WILL BE ISSUED AT MID-YEAR.
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

CRAWLER LOADERS

	1981		1980		1979	
	UNITS	% TOTAL	UNITS	% TOTAL	UNITS	% TOTAL
20-59 HP	425	16%	440	13%	925	13½%
60-89 HP	1,400	52%	1,530	45%	3,020	44%
90-159 HP	850	31½%	940	27½%	2,160	31½%
160 HP & OVER	20	½%	490	14½%	755	11%
TOTAL	2,695	100%	3,400	100%	6,860	100%

NOTE: UNIT COUNT REPRESENTS US RETAIL SALES BY CALENDAR YEAR. ESTIMATES FOR 1981 INCLUDE ACTUAL INDUSTRY PERFORMANCE THROUGH SEPTEMBER.
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

CRAWLER TRACTORS

	1981		1980		1979	
	UNITS	% TOTAL	UNITS	% TOTAL	UNITS	% TOTAL
20-59 HP	1,200	11½%	1,380	12%	2,350	13%
60-89 HP	3,600	35%	3,870	33½%	6,880	38%
90-159 HP	3,300	32%	3,680	32%	4,700	26%
160 HP & OVER	2,250	21½%	2,570	22½%	4,170	23%
TOTAL	10,350	100%	11,500	100%	18,100	100%

NOTE: UNIT COUNT REPRESENTS US RETAIL SALES BY CALENDAR YEAR. ESTIMATES FOR 1981 INCLUDE ACTUAL INDUSTRY PERFORMANCE THROUGH SEPTEMBER.
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

to 15%. IH's model 560 wheel loader, for example, supposedly is being rebated by almost $40,000.

TOHI has also learned that IH postponed fourth quarter 1981 across-the-board price hikes on construction machines. It's possible IH could forego first quarter/1982 price hikes as well.

According to Dataquest's K. E. Kogan, chief CE price researcher, other OEMs (Caterpillar, Case, Deere, Fiat-Allis and Terex/IBH) boosted prices 1½-3½% in the fourth quarter.

Some manufacturers are also lengthening dealer floor plans.

Retail sales of key high volume lines of construction vehicles will likely advance this year. Crawler tractors may edge ahead 3% to 10,660 units; crawler loaders could post an increase of 4% to 2800 machines; wheel loaders will likely advance 4½% to 9240 vehicles; industrial wheel tractors may jump 5% to 22,400 units; and skid steer loaders could also post a 5% hike to 14,700 machines.

However, several construction OEMs aren't internally forecasting substantial recovery in the marketplace until late '82. It's likely manufacturers will continue to offset slow inventory turnover at dealer outlets with more reductions in domestic production schedules.

But a fresh outlook from the Department of Commerce (DOC) appears to bode new hope for housing construction business this year—an industry that consumes nearly 75% of construction machinery year-in and year-out.

A preliminary outlook on '82 commercial activity by the DOC indicates domestic housing starts may increase 13½% this year to 1.22-1.25 million units overall. This compares to actual starts of 1.1 million units in '81 and 1.29 million in '80s.

Housing starts probably won't shift back into high gear until the fall of '82, perhaps missing out on hefty springtime groundbreaking.

Deere's C. B. Reynolds, vice president-marketing, Industrial Equipment Div.; IH's J. E. Monge, vice president-marketing, Equipment Group North America; and Terex/IBH's D. B. MacLaren, director of marketing, North & South America foresee anywhere from flat growth to a 12% rise in sales of crawler tractors, crawler loaders, wheel loaders and log skidders. Industrial wheel tractors are pegged for a 15% rebound.

Preliminary forecasts on federal outlays by the nation's government indicate the Reagan administration will cut dollar outlays for new highway construction 4% to $4.8 billion in '82. Federal aid to local authorities for projects like sewer and water works will recede 5½% to $6.7 billion. Domestic demand for items like motor graders, scrapers and mid-size crawlers will likely be jeopardized.

According to the Department of Energy, coal output above and below the surface should rebound 12½% to 900.2 million ton (816 t) this year, trailing a '81 dip of 3½% to 800.3 million ton (726 t).

IH's Monge, Deere's Reynolds, Terex/IBH's MacLaren and Euclid's R. E. Keidel, vice president-marketing, envision anywhere from flat growth to a 30% increase in sales of scrapers, motor graders, hydraulic excavators and rear dump trucks.

TOHI projects '82 factory shipments of scrapers may jump 8% to 3770 units; motor graders may rise 3% to 7600 vehicles; hydraulic excavators will advance 4½% to 4070 machines; and rear dump trucks could increase 7% to 2060 units—thanks to strong international markets. ■

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BATTLING IMPORTS WITH ROBOTS

Domestic assemblers of farm tractors appear to be entering separate but similar manufacturing strategies to become low cost producers by 1985, thwarting foreign penetration in markets below 100 hp.

John A. Stark

Farm tractor producers in the US appear to be maneuvering themselves into a makeshift lineup for a skirmish with low horsepower vehicle imports.

Since the start of 1981, foreign assemblers of low cost tractors apparently kicked off campaigns to vertically integrate all ranks of the two-wheel-drive farm tractor business.

The chief domestic importers of machines are Belarus of the USSR, Deutz of Germany, Fiat (Hesston) of Italy, Kubota of Japan, Leyland of the UK and Long of Romania.

Kubota continues to be the most successful importer of farm machines, retailing about 17,100 units in 1980 for a 10% share of market. Deutz is a distant second, selling nearly 2700 vehicles for a mere 1½% piece of the action.

What reportedly concerns domestic manufacturers of farm tractors, however, is Kubota's apparent bid to build a competitive edge within the 40-99 hp segment of the domestic business. This has been an exclusive market for domestic giants like John Deere, Ford, Massey-Ferguson and International Harvester.

But domestic assemblers can fight fire with fire, using sheer unit volume to become low cost producers of these machines.

Ford's M.H. Manning, vice president and division general manager, recently fired the first salvo by replacing Ford's existing lineup of low horsepower (30-90 hp) 2WDs with 10 new models. He also disclosed that Ford will spend $100 million annually during the next five years to become a low cost assembler of tractors stateside. Manning explained Ford will triple its use of computer aided design and add 100 robots to its network of global manufacturing sites.

"The cornerstone of this five-year business plan is our goal to improve market share to 25% of North American business," said Manning.

To retain leadership, high volume producers like Deere, Ford and Harvester need to drastically strengthen individual manufacturing processes. Japanese counterparts such as Kubota, Yanmar, Shikawajima-Shibaura, Toyosha, Komatsu, Mitsubishi and Iseki currently outmatch them on a cost efficiency basis.

IMPORTERS VERTICALLY INTEGRATE THE DOMESTIC FARM TRACTOR BUSINESS

	1980			1979		
	IMPORT SALES	TOTAL SALES	% IMPORT	IMPORT SALES	TOTAL SALES	% IMPORT
0-39 HP	46,800	46,800	100%	49,300	49,300	100%
40-99 HP	28,100	58,100	48%	28,800	65,000	44%
100 HP & MORE	1300	50,300	3%	1020	62,500	2%
ALL 2WDs	76,200	155,200	49%	79,120	176,800	45%
ALL 4WDs	6000	10,900	55%	4330	11,500	37½%
TOTAL TRACTORS	82,200	166,100	49%	83,450	188,300	44%

NOTE: UNIT COUNT REPRESENTS US RETAIL SALES BY CALENDAR YEAR. VERSATILE 4WD SALES ARE CONSIDERED IMPORTS. ALL FIGURES ARE ESTIMATES BASED UPON ACTUAL UNIT COUNT.
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

Kubota, for example, manufactures about 60,000 small farm tractors a year at its highly automated Tsukuba complex, in addition to another 40,000 units elsewhere. About one-third of its annual output is exported, of which 57% is retailed stateside.

Kubota's Tsukuba facility is the largest of its kind in the world. But it only employs 450 workers to assemble 5000 farm tractors each month. To reach similar economies of scale in the manufacturing process, a US based counterpart would need to produce nearly 50,000 tractors annually.

Only Deere could reach that kind of output at present industrywide cost efficiencies.

Domestic OEMs are now automating the production of vehicles via strategic deployment of flexible manufacturing systems teamed with robots.

Ford's R.J. Reed, manager of advanced engineering, told *TOHI*, "We plan to keep our share of market through reduced manufacturing costs."

Payoffs from the deployment of robots could snowball into substantially higher production efficiencies through: quicker turnover of inventory; less work in progress; reduced lost time; better on-time delivery from suppliers; improved quality control; and possible shorter lead times at the factory.

IH's R.N. Nagel, manager of intelligent machines and robotics at the firm's Automation Technology Center, emphasized, "Robots are a key ingredient to the factory of the future."

Harvester deploys about 45 robots throughout its large production facility network and is considering the use of another 13 or more. About 15 robots presently work at IH's newly renovated Rock Island, IL farm tractor assembly site.

Although all of the Rock Island robots perform routine tasks like machine loading and unloading of gear blanks, painting, material handling in heat treating operations and spot welding, Nagel's eyeballing greater use of robots for arc welding, "because 1300 jobs in our company are arc welded."

Ford's Reed and Deere's R.J. Maller, manager of production engineering, agree.

According to Reed, "What previously has limited application of arc welding was the inability of robots to track a seam. But that technology is just about at hand with advanced sensors."

Ford plans to install approximately 40 robots at its Romeo, MI site where it fabricates components for industrial products. It has another 40 at its transmission and rear axle complex in Belgium, plus 20 more at an engine assembly facility in the UK. Robots will hit shop floors by '85.

"We have certain objectives in terms of cost [labor and overhead]," Reed remarked. "Robots are a way of reaching our goals of cost efficiency. We're aware, just like everyone else is, that to remain competitive we've got to reduce costs. We're not installing robots just because it's nice to have a robot.

"When we bring in a robot, it has to pay for itself," he added. "We are establishing a study right now to map a strategy whereby we'll install certain robots at certain plants for certain functions. This planned drive by '85 to be the least cost producer of farm machinery may be our start of automated production."

Deere and Harvester concur. IH's Nagel said, "The next logical step for robots is use in assembly operations." Least cost producer Kubota can attest to that.

Domestic producers of farm tractors appear to be borrowing a chapter right out of a Japanese business manual to outflank the imports with their own strategy. But didn't Japan borrow the business manual from the US? ■

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DOMESTIC FARM TRACTOR IMPORTS PICK UP STEAM AROUND THE INDUSTRY

	1980			1979		
	CO. IMPORTS	TOTAL SALES	% IMPORTS	CO. IMPORTS	TOTAL SALES	% IMPORTS
KUBOTA	17,100	17,100	100%	20,900	20,900	100%
JOHN DEERE	16,700	41,300	40½%	15,800	46,300	34%
FORD	10,000	28,250	35%	8100	29,150	28%
INT'L HARVESTER	8700	25,000	35%	9608	35,100	27%
J.I. CASE	4200	12,100	35%	4000	11,300	35%
MASSEY-FERGUSON	3200	17,000	19%	2200	17,500	12½%
DEUTZ	2700	2700	100%	2300	—	—
ALLIS-CHALMERS	2000	10,550	19%	2200	10,300	21%
VERSATILE	1400	1400	100%	1400	1400	100%
WHITE	1000	4900	20½%	850	7350	11½%

NOTE: UNIT COUNT REPRESENTS US RETAIL SALES BY CALENDAR YEAR.
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

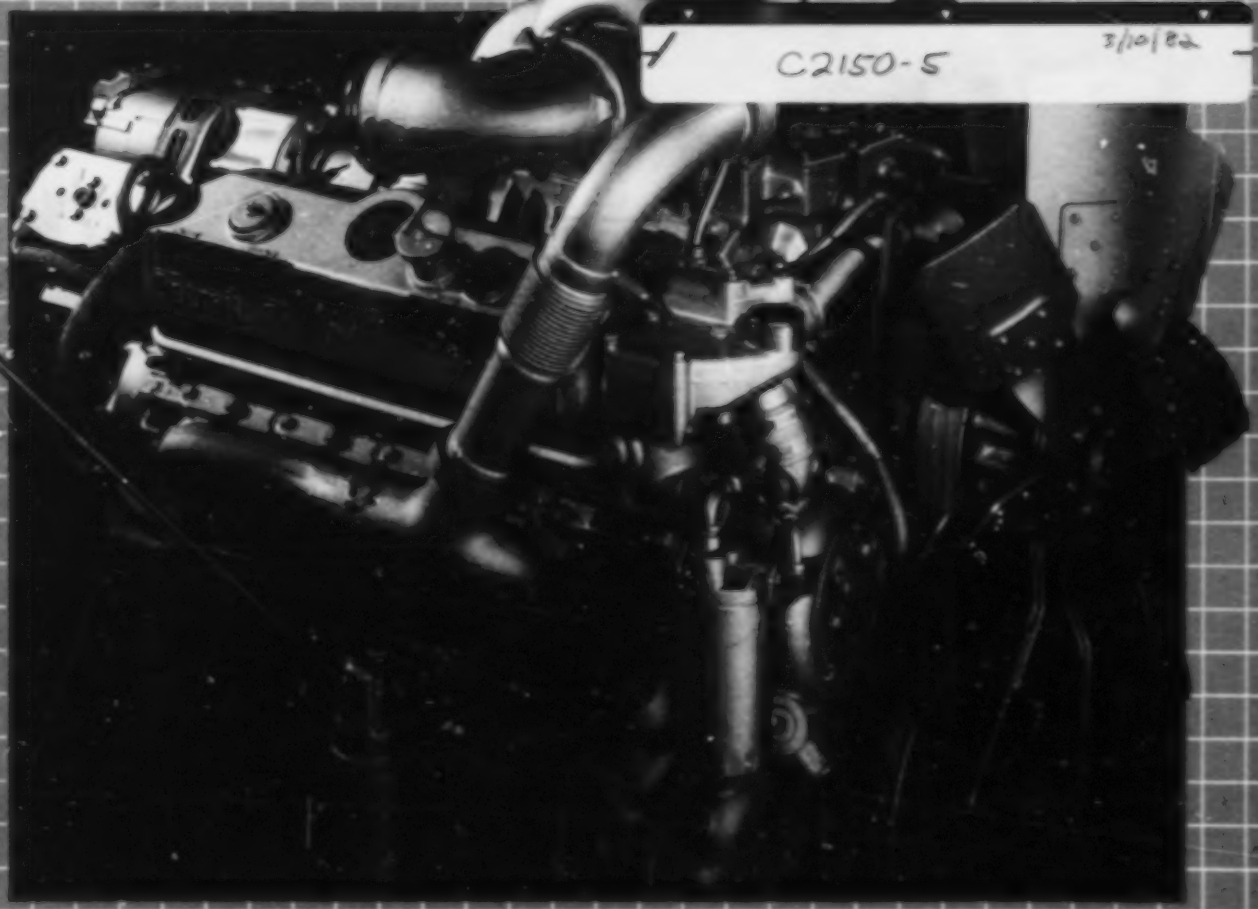
Chilton's

TRUCK & OFF-HIGHWAY INDUSTRIES

MARCH / APRIL 1982

Special Reports
Changes Ahead In Cabs And Seating

C2150-5 3/10/82



FINE TUNING TURBOS FOR EFFICIENCY

Iveco Motors Into U.S. Truck Market

Fluid Power: Hidden But Booming Industry

Chilton's

March/April, 1982

TRUCK & OFF-HIGHWAY INDUSTRIES

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COVER

DDA's new Silver Series engines represent state-of-the-art turbocharging and aftercooling

NEXT ISSUE

What's on the horizon for ag equipment, the CAD/CAM and flexible manufacturing boom and brakes and suspensions are in the spotlight.

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of models offered in the US.

"We started out with too many models available. We may expand a little again—I know that some of our West Coast dealerships felt that there was one particular series we should have kept in the Magirus line."

The new I-Series deal with IH is not Iveco's only iron in the fire. The company is planning on introducing a light Class-2 vehicle, called the S-Series, to the US soon. When asked if he has any concrete plans on the S-Series introduction, Bostic replies, "Yes. I have about three concrete plans, all different.

"We're having strategy sessions now to determine what configurations we're going to offer the truck in. We don't want to get into the same situation we had with the Magirus—too many models."

The S-Series will compete with Ford Econoline-type vehicles, and according to Bostic will be "very price competitive. The S-Series will offer the same kinds of differences between American and Iveco vehicles that exist in Z/Is," he claims.

"In other words, when you're talking about diesel and the sophisticated componentry that comes with it, you're talking about a European class vehicle." And even though all Iveco entries in the US are European built, Bostic says his company is currently investigating the possibility of sourcing some major componentry in the US.

Bostic, who joined Iveco of North America in December of '81, is no stranger to the transportation business. Aside from work details at AMC and GM, he came to Iveco from International Harvester where he headed the Scout program and was also vice president of sales and marketing for the agricultural equipment group.

When asked whether his ties at IH were instrumental in pulling through the I-Series deal, Bostic chuckles. "Well, it didn't hurt." ■

Key Indicators

Selected Construction Equip., Producers' Shipments, 3rd Quarter* $1,270,646,000

— Units —	Dec. '81	Dec. '80	Year to Date 1981	Year to Date 1980
New Housing Starts (Actual)	62,100	95,900	1,066,600	1,292,200
US Total Truck Factory Sales (Classes 3-8)	15,495	16,318	227,754	246,375
US New Car Production	349,702	469,540	6,250,066	6,372,309
Farm Machinery, US / Retail Sales				
2wd Farm Tractors, Over 40 hp	7,315	5,938	94,154	108,449
4wd Farm Tractors, Total	813	905	9,676	10,887
Self-Propelled Combines	1,921	1,690	26,830	25,760

Construction, Mining & Materials-Handling Equip. Manufacturing**	Dec. '81	Nov. '81	Year to Date '81	Year to Date '80
New Orders	$ 3.4	$ 3.6	$ 42.2	$ 35.6
Shipments	3.5	3.5	40.1	35.2
Inventories	9.7	9.6	—	—
Unfilled Orders	10.9	11.0	—	—
Manufacturers Value of Shipments**				
Primary Metals, Total	$ 9.8	$ 10.6	$137.9	$134.0
Steel	5.1	5.5	70.9	62.4
Nonferrous Metal	3.8	4.1	54.0	58.4
Nonelectrical Machinery Equip. Industries, Total	17.1	17.4	204.3	182.8
Engines & Turbines	1.3	1.4	16.5	13.8
Farm Machinery & Equip.	1.1	1.1	14.7	13.6
Metalworking Machinery	.8	.9	11.6	11.1
General Industrial Machinery	1.4	1.4	17.1	15.9
Transportation Equip. Industry, Total	17.2	16.8	219.5	191.3
Motor Vehicle & Parts	10.0	10.0	137.4	114.9
Fluid Power Equip. (Index 1972 = 100)	264.0	269.0	—	—
Machine Tools***				
Net New Orders	$ .1	$ .1	$ 2.9	$ 4.6
Shipments	.4	.4	5.0	4.6

*Not seasonally adjusted, includes off-highway wheel tractors, mixers, pavers, wheel loaders, scrapers, graders, rollers, off-highway equip., and mountings.
**Billions of dollars, seasonally adjusted monthly total (unless otherwise noted).
***Cutting and forming, domestic and foreign.

Sources: US Dept. of Commerce, Individual Motor Vehicle Mfgrs., National Fluid Power Assn., NMTBA, FIEI, TOHI.

Big Flap Over Splash Guards

by Paula D. Hodges

A surprise amendment to a truck size bill that would mandate costly spray suppressant devices on all tractors and trailers within two years has kicked up a splash of lobbying by the manufacturers and the American Trucking Association Inc. (ATA).

Six manufacturers with the largest, Monsanto Co., at the helm have launched a campaign to convince Congress to require the equipment which costs $175-$225 per rig more than conventional mud flaps.

The amendment is sponsored by Sen. John Danforth (R-MO). ATA president Bennett Whitlock says, "We have no objection if DOT requires splash and spray suppressants that are reliable, cost effective and that contribute to safety. However, it is totally wrong for Congress to legislate equipment requirements ... it should be done by DOT after extensive testing."

Danforth tacked the amendment on the truck size bill after his legislative counsel, Jerry Cox, had been shown the equipment by Monsanto. Cox says that with the truck bill calling for longer and wider trucks, Danforth believes that "splash and spray suppres-

Fluid

by John Forwalter

Seldom has a $6.1 billion industry been so well hidden.

Even though the National Fluid Power Assn. shows both hydraulic and pneumatic applications rising rapidly, most of us don't instantly connect the tubes and filters seen on the outside of an engine, or raising the arm of a backhoe with this massive industry.

Even engineers in one discipline may not easily grasp the fluid power application in another part of the industry. Off-highway equipment OEMs tend to see fluid power as a static, although necessary field, mostly the concern of the purchasing department. Yet the more efficient off-highway equipment becomes, the more fluid power becomes a primary engineering concern.

Fluid power cylinders, actuators, pumps, motors and hydrostatic drives may come to mind as major hydraulic components. The development of these is well advanced, although improved versions reach the market constantly.

What isn't so obvious is that fluid power valves and hose fittings are a developing technology as well. There are almost 800 companies with 1200 plants providing products and services to OEMs in the automotive and off-highway industries.

Typical of the OEM interaction with fluid power specialists is the situation at Ford Tractor Operations. J. F. O'Donnell, chief engineer for agricultural products, detailed the design of several hydraulic system improvements for the new Ford Series 10 tractor. Chief among them are four closed center remote valves used to handle complex instrument requirements.

"Ford Tractor Operation engineers set up the user requirements that need improvement or change," said O'Donnell. "They design the hydraulic circuits that meet those requirements and spec the required performance.

"Then, if we are working with a commercial valve builder, such as Rexroth's Mobile Hydraulic Div. which did the Series 10 under 100-hp valves, we ask them to provide samples that meet those specs.

"Normally we work with only two or three suppliers at this stage. This allows us to set the economics of the operation through our purchasing department. The coupler builder in this case was Snaptite.

"The new closed center remote valves, available on all models, have four positions—raise, float, neutral and lower. An improved valve feathering control also allows more precise, smoother implement control. An automatic drop control on the four-cylinder power lift prevents rapid implement drop to reduce the chance of damage to mounted implements.

Ford's Series 10 tractor features four closed center remote valves.

"Each remote valve has its own flow control lever to match the flow of hydraulic fluid to specific work requirements with reduced system back pressure. Individual lever operated breakaway couplers make it easy to disconnect hydraulic lines from valve connections, even when the lines are under pressure.

"Normal hydraulic system back pressure is reduced by routing return oil directly to the reservoir. Return oil previously supplied for cooling, internal lubrication, PTO control and Dual Power control now is supplied by a larger auxiliary pump. The reduced system back pressure gives more positive control of implement one-way motors and faster return of hydraulic cylinders."

Clark Equipment Co.'s design for its model 2000 articulated Bobcat loaders makes use of hydraulics for the control system, the reversible hydrostatic motor and tandem hydraulic pumps for its hydraulic equipment operation.

Clark's Melroe Div. engineers designed a hydrostatic motor for the loader that required two 2.5-in.^{3} (41-cm^3) hydrostatic pumps to power all four wheels. The second pump cuts in at 2.4 mph (3.9 km/h) in forward only. A double filtration system protects the hydrostatic drive.

Many vehicle OEMs are themselves major fluid power suppliers of systems and components not only for internal consumption, but also to other OEMs. Caterpillar, for example, had the greatest market share among fluid power manufacturers in 1980. Fluid power applications developed for an internal use often become separate saleable products in order to reach economies of scale.

Projections of fluid power growth

Power: THE HIDDEN BUT BOOMING INDUSTRY

As off-highway technology becomes more complex, more and more fluid power applications are becoming essential to heavy equipment. Sales for 1982 are projected to increase more than 20% over last year.

for 1982 indicate that sales of hydraulic and pneumatic products will rise about 22.5% over last year. While many readers may consider only hydraulic, and not pneumatic equipment applicable to heavy-duty vehicles, that is hardly the case. Air over hydraulic is used in off-highway equipment all over Europe, including agricultural equipment, according to O'Donnell.

More importantly, heavy trucks have been using air brakes for decades. Even the new disc brake setups are pneumatic, according to Karl W. Schipper, engineer at Ford Motor Co. Schipper is part of a group that studied disc and drum brakes on heavy trucks. "Air is much faster," he said, and always will be.

Imperial Clevite's James S. Evenson, applications engineer and OEM contact, agrees. "Whenever very high pressures and quick response time are significant to mobile equipment applications, pneumatics will continue to be explored."

Air over hydraulic is also used by heavy equipment manufacturer Manitowoc Co., Inc.

James Morrow, chief engineer of Manitowoc's Crane Div., speaks enthusiastically of air control valves. "With big equipment, a breach [in a hydraulic] line means shutdown and immediate repair. With air, it is simple maintenance at the end of the day.

"For situations where fumes and vapors create hazards, an air valve has obvious safety advantages. Bleeding of air lines is no big problem. The accelerated wear that comes with high cycling situations is obviated by the use of air."

Morrow expects the use of pneumatics to increase in heavy off-highway equipment. ■

PROJECTED FLUID POWER SALES

Based on index year 1972, (volume $2,125 billion).

HYDRAULIC PRODUCTS

QTR	1st	2nd	3rd	4th
1981	266	291	278	270
1982	320	360	310	340
%chg	+20%	+25%	+20%	+25%

PNEUMATIC PRODUCTS

QTR	1st	2nd	3rd	4th
1981	253	260	250	280
1982	315	325	300	335
%chg	+25%	+25%	+20%	+20%

Top Fluid Power Manufacturers

Manufacturer	1980 Shipments (millions of dollars)	Market Share
Caterpillar	$360	9.1%
Vickers	335	8.5
Parker-Hannifin	305	7.7
Commercial Shearing	135	3.4
Chicago Pneumatic	130	3.3
Gardner Denver	125	3.1
Aeroquip	110	2.8
Weatherhead	105	2.7
Ingersoll Rand	100	2.5
Gould	90	2.3
Hydreco	88	2.2
Automatic Switch	85	2.1
Worthington	70	1.8
Anchor Coupling	65	1.7
John Deere	60	1.5
Rexnord	58	1.5
Sundstrand	51	1.3
Cessna	50	1.1
J. I. Case	45	1.0
Bellows-Valvair	44	1.0

Notes: Includes captive and resale components; excludes repair parts for components. Market shares based on total shipments of $3,955 million in 1980.

Based on material from Frost & Sullivan Inc., New York City

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NEW LIFE FOR MID-SIZE CABOVERS?

Medium-duty cabover trucks may gain a new lease on life if domestic producers like Ford, GMC and International Harvester opt to source truck cabs from European affiliates. It could occur by 1984-85.

by John A. Stark

Mid-size trucks built with cab-over-engines appear to be dying a slow death stateside, but a post-mortem is premature. An 11th-hour recovery is still possible.

Forward control type cabover trucks could obtain a fresh lease on life if domestic high-volume manufacturers like Ford, GMC and International Harvester opt to source offshore low-volume forward control cabs for stateside Class 6-7 units.

Truck & Off-Highway Industries has learned that all three are considering this move.

Ford, for example, reportedly is sizing up a new prototype Class 6-7 forward control cab designed by its UK nameplate affiliate. Supposedly a derivative of the Cargo, it will be made in the UK and sent to the US by 1984-85.

GMC has developed two business plans, one for the short term and another for the longer term, whereby the firm could re-enter the Class 6 forward control type cabover market, if retail volume warrants it, by 1984-85.

R. W. Truxell, GM vice president and division general manager, disclosed that his firm has been testing a 150 hp JCR-series Class 5-6 Isuzu cabover truck for possible use in the US.

"That's if forward control cabovers catch on quickly at the marketplace like they did in Europe," says Truxell. "GMC could then use the Isuzu mid-size cabover to fill the market need until it's ready to tool up for the manufacture of its own forward control tilt model."

If the market shifts slowly to Class 5-6 forward control cabovers, Truxell said GMC wouldn't market the Isuzu model in the US, "but rather tool up for its own Beford TL-type Class 5-6 cabover model in the UK for US distribution."

He speculated that GMC would share tooling costs (perhaps $40-$50 million) for the new prototype forward control cab with Bedford. Bedford's new TL-series medium-duty trucks compete head-to-head with Ford's new mid-size Cargo units in Europe where cabovers are widely used.

Don't be surprised if Ford and GMC enter the domestic mid-size truck business by 1984-85 with forward control cabs sourced from European affiliates.

US high-volume truckmakers hope to source mid-size forward control truck cabs from European affiliates to extend economies of scale in the global truck cab production business. It will also heighten use of factory production capacity, quicken investment payback by spreading costs over greater retail volumes, and split costs for new truck development with one or more partners.

GMC's J. E. Cote, chief engineer-body & sheet metal, said, "We left the mid-size cabover truck business in 1980 because yearly market volume dropped to less than 10,000 units. Cabover share of that business failed to spur enough activity at the factory to profitably assemble these units."

Now GMC is considering re-entry into the US market by 1984-85 with forward control truck cabs sourced from a UK subsidiary already tooled to fabricate the cabs. A final decision apparently hinges on the fate of unit volume for cabovers in the domestic marketplace within the next year or two.

According to Ford's E. T. Mabley, heavy-duty truck development

manager, "There's nothing inherently wrong with assembling a European designed forward control cab atop a North American truck chassis—nothing that can't be accommodated by modification. But it's a different matter going from North American to Europe with cabs, due to tougher design standards like A-pillar impact structural tests."

The feasibility of installing foreign cabs on US chassis is dependent on government regulations limiting vehicle width to 70-75 in. and length to 96 in. (1778-1905 and 2438 mm) in BBC (bumper to back of cab). Most Japanese and European mid-size cabover models meet these qualifications.

"Another limitation could be the cost of the cabover units," GMC's Cote explained. "All of the systems [clutch, transmission, throttle, hinge, latches and cab assist] between the cab and chassis are more costly because they have to be able to accommodate the cab tilting.

"A conventional truck can be made at less cost than a forward control truck, due to the fact that a mid-size COE's steering column and brake pedal have to slide, and accelerator linkage has to accommodate the tilt."

Some truck component systems design may require alteration, too. Air over hydraulic braking systems are commonly used on European mid-size trucks. "This may not be acceptable in the US where braking always has been hydraulic or air—not a combination of the two," Cote remarked.

Redesigning may be needed to properly mate US powertrain offerings. Bedford's TL-series, for instance, is designed with a floor pan that accomodates only inline configurated engines. Since V-shaped gas and diesel powerplants are widely used in the US, cab floor pans would need redesigning. This leads to a considerable retooling investment.

But forward control truck cabs offer better driver visibility and more maneuverability over conventionals. Conventionals, however, muster better durability of sheet metal during crashing.

Mid-size truckmakers also find it more convenient to install a wide variety of engine sizes and shapes in conventionally-designed trucks, while commonizing lighter duty pickup truck cabs with conventional mid-size models.

"Ford and GMC sprung off their higher volume pickup-type truck cab and installed it on the mid-size truck chassis," said Cote. "This kept the cab in roughly the same position on the chassis—low and behind the front tires. Our medium-duty truck now is a conventional model based upon our pickup truck.

"A medium-duty vehicle is a low annual mileage, in-and-out type of unit. This essentially is why we extended the use of our pickup truck cab by placing it on a mid-size truck chassis, low and behind the tires for easy entry and exit."

According to Ford's Mabley, one of the toughest items for mid-size forward control type cabovers to overcome is the competitive pricing of conventionals.

In some cases, price tags for cabovers outdistance conventionals by more than $2000. "There are more product costs associated with a tilted forward control truck cab," GMC's Cote pointed out.

It is possible that the substantial price differential may be narrowed with the importation of European mid-size truck cabs for assembly atop North American chassis, to fill in a market void. Recently, however, this medium-duty cabover market void is beginning to disappear. ■

GMC left the mid-size cabover truck business in 1980 by phasing this forward control model out of production at Pontiac, MI. Re-entry with a Bedford vehicle from the UK is being considered.

Mid-Size Cabover Truck Volume Slows Stateside

CLASS	TYPE	1979 VOLUME	1979 %	1980 VOLUME	1980 %	1981 VOLUME	1981 %
6	Cabover	3,742	2.8	1,166	1.9	159	0.4
	Conventional	131,269	97.2	61,285	98.1	36,127	99.6
	Total	135,011		62,451		36,286	
7	Cabover	7,809	17.7	4,249	7.6	1,394	5.7
	Conventional	36,213	82.3	51,326	92.4	24,530	94.3
	Total	44,022		55,575		25,924	

Note: Unit Volume Represents US Factory Sales Of Trucks By Calendar Year. 1981 Volume Is For The First Six Months Only.
Source: Motor Vehicle Manufacturers' Assn.

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TRUCK & OFF-HIGHWAY INDUSTRIES

MAY/JUNE 1982

Air Disca Challenge Brake Market

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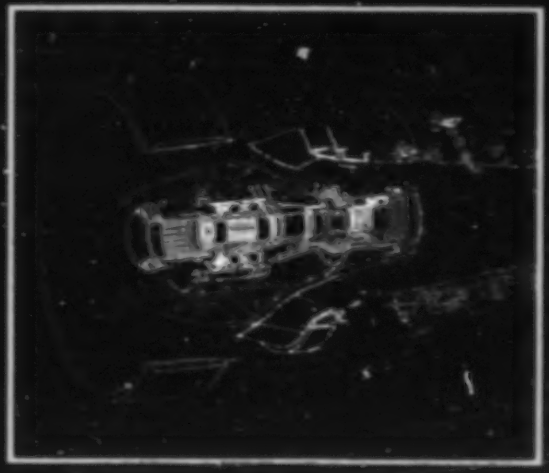
STEIGER



New High Speed Ag Tractors

CAD/CAM And Flexible Manufacturing

Easy Riding Off-Road Suspensions

THE DRIVE FOR PRODUCTIVITY

Chilton's

May/June, 1982 Volume 3 Number 12

TRUCK & OFF-HIGHWAY INDUSTRIES

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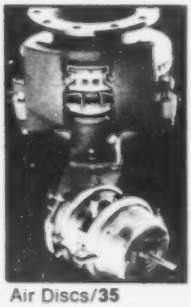
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etc. The design changes that do occur hit the area of greatest concern to the users."

Wehr notes some examples. "The Tri-View mast hydraulics are more efficient and durable. Current machines are quieter and smoother. In electronics we're looking at more onboard diagnostics as time goes by.

"We believe customers are suffering from the high cost of operating old equipment. The average industrial truck is ten years old, and excessive operating costs and downtime prove them inefficient. If owners were to analyze their total costs, both operator and machine costs, we believe that the greater efficiencies of new machines would cut the number of trucks and operators to do an equal job." ■

Key Indicators

Selected Construction Equip., Producers' Shipments, 4th Quarter* $1,188,215,000

— Units —	Feb. '82	Feb. '81	Year to Date 1982	Year to Date 1981
New Housing Starts (Actual)	51,300	71,900	—	—
US Total Truck Factory Sales (Classes 3-8)	15,435	18,937	27,871	36,444
US New Car Production	323,661	478,843	603,434	934,152
Farm Machinery, US / Retail Sales				
2wd Farm Tractors, Over 40 hp	4,899	5,435	12,083	12,483
4wd Farm Tractors, Total	568	613	1,230	1,438
Self-Propelled Combines	509	1,015	1,883	2,691

Construction, Mining & Materials-Handling Equip. Manufacturing**	Feb. '82	Jan. '82	Year to Date '82	Year to Date '81
New Orders	$ 2.8	$ 2.9	—	—
Shipments	3.4	3.1	—	—
Inventories	9.8	9.6	—	—
Unfilled Orders	9.9	10.5	—	—
Manufacturers Value of Shipments**				
Primary Metals, Total	$ 9.8	$ 10.5	—	—
Steel	4.9	5.4	—	—
Nonferrous Metal	3.9	4.1	—	—
Nonelectrical Machinery Equip. Industries, Total	17.3	16.3	—	—
Engines & Turbines	1.2	1.3	—	—
Farm Machinery & Equip.	1.0	.8	—	—
Metalworking Machinery	.9	1.0	—	—
General Industrial Machinery	1.4	1.4	—	—
Transportation Equip. Industry, Total	16.5	15.2	—	—
Motor Vehicle & Parts	9.9	9.0	—	—
Fluid Power Equip. (Index 1972 = 100)	245.0	260.0	—	—
Machine Tools***				
Net New Orders	$ .1	$ .2	$ .3	$ .5
Shipments	.3	.3	.7	.8

*Not seasonally adjusted, includes off-highway wheel tractors, mixers, pavers, wheel loaders, scrapers, graders, rollers, off-highway equip., and mountings.
**Billions of dollars, seasonally adjusted monthly total (unless otherwise noted).
***Cutting and forming, domestic and foreign.

Sources: US Dept. of Commerce, Individual Motor Vehicle Mfgrs., National Fluid Power Assn., NMTBA, FIEI, TOHI.

Truck Show Packs 'Em In

"Cautiously optimistic" is how show president Gary Sherrard described the mood of exhibitors at the International Trucking Show held March 10-12 at Moscone Center, San Francisco.

"Realistically viewing the situation," Sherrard said, "business is terrible. Obviously, everybody's hoping for a fairly early, probably fourth quarter, turnaround. Nobody that I've talked to expects things to get any worse than they are."

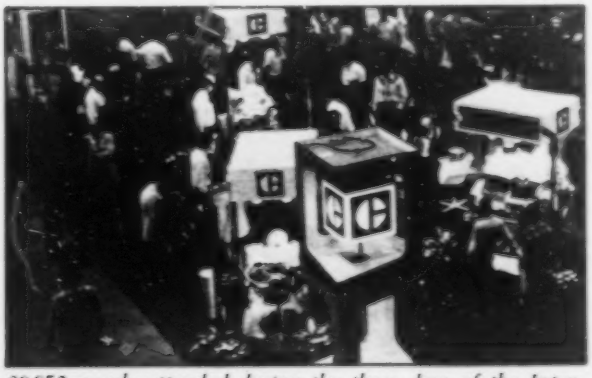
One company spokesman prefaced a press conference by saying, "We'll get two questions out of the way right now . . . 'How's business?' It's been better . . . 'When's it going to get better?' We don't know."

Bad as things are, you couldn't tell it by the attendance at the show. Final estimates indicate 30,852 truckers and their guests made the trek to the show, doubling the attendance of the last show held in San Francisco in 1978. 350 exhibitors showed their wares in displays covering 260,000 ft² (24,154 m²) of the attractive new Moscone Center.

Highlights from the show included Bendix Corp.'s announcement of an April 1st production start-up for its new air-actuated disc brake. Bendix expects to produce about 3300 air disc brakes in 1982.

Spicer Transmission Division of Dana Corp. debuted its new CM-55 series of five-speed medium heavy truck transmissions, and Fruehauf Corp. displayed its new PC aluminum platform trailer and its PB80 lightweight steel platform trailer. Also on hand was Fruehauf's FEV2000 experimental aerodynamic tractor trailer.

(Cotninued)



30,852 people attended during the three days of the International Trucking Show, held March 10-12 at Moscone Center, San Francisco.

AGRICULTURAL TRACTORS

OEMs Respond To High Yield Farming

The consolidation of American farms started the surge towards larger, higher horsepower tractors. Now, these tractors are being designed to be more reliable, comfortable and cost effective as high speed/high yield farming becomes the industry rule.

by John Forwalter

The US Department of Agriculture estimates the average size farm is 453 acres, and in some states 5000-7000 acres is the norm. But even with this increased size, tilling times have been cut because of the newest generation of high powered tractors.

The pressure's still on to increase the speed and effectiveness of the tractor. Since optimum planting times are as few as eight to eleven days each spring, there's continuing research on tractor speeds and effective plowing. Improvements in hydraulics and electronics have added to the sophistication of the tractor.

Robert L. Green, general manager-marketing of J I Case's North American Equipment Operation and industry spokesman for the Farm & Industrial Equipment Institute (FIEI) elaborates on this. The emphasis on reliability becomes more and more important as farmers rely on fewer large tractors instead of many small ones, he says.

"With numerous small tractors in the field, downtime of one tractor in the planting season wouldn't kill you," says Green. "But now the new large tractors costing $75,000 to $200,000 must do the job. Failure of your only $75,000 tractor can put you out of business. Tractor reliability, therefore, becomes a major design criteria."

Green notes that the efficiencies of powertrains have resulted in more electronics and better hydraulics.

"These support better tractor operation and improve efficiencies in the use of plows and other farm implements," says Green. "Flexibility of connection, speed of pickup and disconnect, all become part of the operator's effectiveness with the equipment."

Green says Case supports the rapid farming concept. "Increasing the number of tractors and the size of implements reaches a limiting cost as well as a mechanically limited phase," Green emphasizes. "Increased travel speeds with smaller implements can do a more cost effective job than a 40-ft disc.

"Total field capacity is achieved by designing tractors for 5 mph farming, reducing compaction to maintain soil characteristics and dropping the power robbing ballast to avoid overload situations.

"In the next decade we may see the present 5-7 mph pace of rapid farming increase to 8-10 mph tractor working speeds."

Green emphasizes that size isn't the final factor in where tractors will go. He claims it's the up front costs and the inability of the operator to use all the power he's bought that are the determining factors.

"The trend towards energy efficient powertrains that began with improved engines and hydrostatic transmissions has accelerated," Green states. "Microprocessors to control powertrain functions increase efficiencies, too. The use of orbital motors (to operate seeders, etc.) to avoid parasitic power losses is also an improvement.

So is the trend towards higher horsepower slowing down?

Tom Wilkinson, manager of Agricultural Tractor Planning at Deere & Co., Moline, IL, says, "Higher power tractors will be needed by the largest agri-business type farmer. There are indications, however, that total annual horsepower sold by the industry may well have leveled off.

"Increased use of energy efficient conservation tillage practices by farmers seems to be a factor in the slower growth in average tractor power. But that applies to the industry generally."

The individual farmer's main concern is for timely tillage and planting operations to maximize yield, according to Wilkinson. If he adds more land he must either use more labor or buy larger equipment. The shrewd operator must consider the tradeoffs.

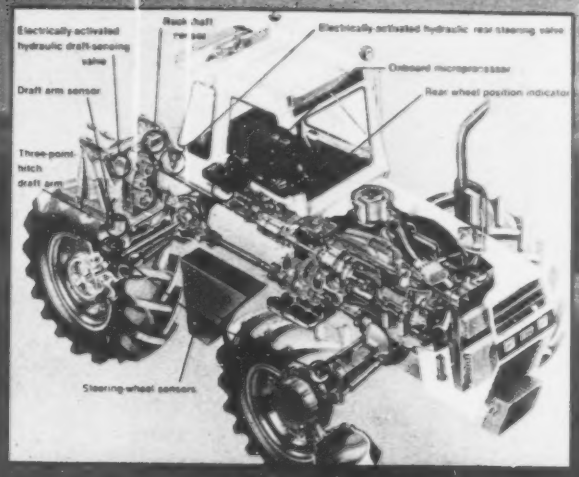
"Increased efficiency is the name of the game," says Wilkinson. "Insofar as the equipment is concerned, this includes improved diesel economy, energy efficient transmissions, improved hydraulic systems, and elaborate but cost effective monitoring systems.

"As an example, the new Deere 50 series 4wd tractors have a dual charge pump system for hydraulic and transmission oils which eliminates dependence of one system on the other."

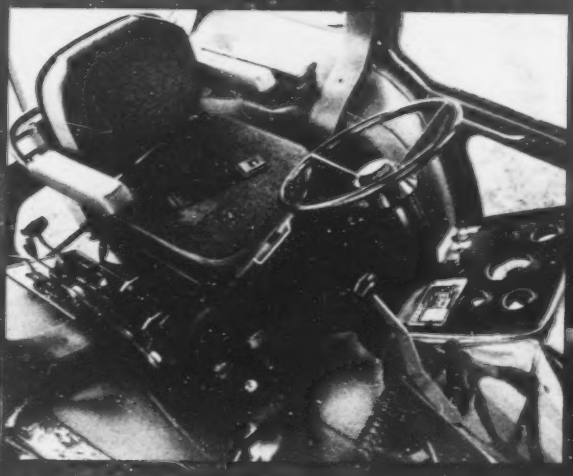
Wilkinson says Deere now concentrates on more productive tractor implement systems.

"Our 300-hp 8850 4wd tractors have a category hour hitch which uses two lift-assist cylinders to give 18% more lift capacity than earlier 4wd models. The main hydraulic

(Continued)



Energy efficient powertrains and operating modes make use of sensors and controls, as seen in this Case Series-90 4wd tractor. The thrust of electronics, electro-hydraulics, microprocessors, sensors and indicators affects every part of tractor functioning.



The interior of this Ford 7710 ag tractor shows that increased comfort has almost reached the level of the icing on the cake.

Ag Tractor Sales Rise Slowly, Then Surely

(farm wheel tractor retail sales and projections, US manufacturers)

	1981 (actual)	1982 (projected)	% '81-'82 change	1983 (projected)	% '82-'83 change
all tractors under 40 hp (except lawn & garden)	47,735	47,830	+ .2%	50,130	+ 4.8%
all tractors over 40 hp	103,800	105,700	+1.8%	113,000	+ 6.9%
40-99 hp	50,966	51,100	+ .3%	53,600	+ 4.9%
over 100 hp 2wd	43,188	43,360	+ .4%	48,000	+10.7%
over 100 hp 4wd	9,675	10,265	+6.1%	11,300	+10.1%
total, all tractors	**151,535**	**153,530**	**+1.3%**	**163,130**	**+ 6.3%**

FIEI members project a flat market in 1982 in their survey released in January, according to Robert L. Green, general manager, marketing, World Wide Agricultural Equipment Operations, J I Case Co. An increase of 5.0% in retail dollar volume is expected. The principal reasons given for the expected increase are rising equipment prices and a continuing shift to larger machines.

pump on the 8850 has 50% more capacity than the 8640 model, previously top of the Deere 4wd lineup.

"Additionally, selective control valves with ISO (International Standards Organization) couplers are used on all three models. The new valves have larger openings for increased hydraulic flow, meaning more power for orbital motors and hydraulic pumps. The increased flow also permits implements to be raised and lowered quickly for fast turnaround in shorter headlands."

Dallas G. Lien, vice president-engineering of Steiger Tractor also says size in tractors has its limitations.

"The market for very large horsepower tractors is very small," Lien explains. "Steiger's normal line is up to 470 hp. But there was some interest in a 525-hp unit. The company also worked for some time on a 750-hp unit concept."

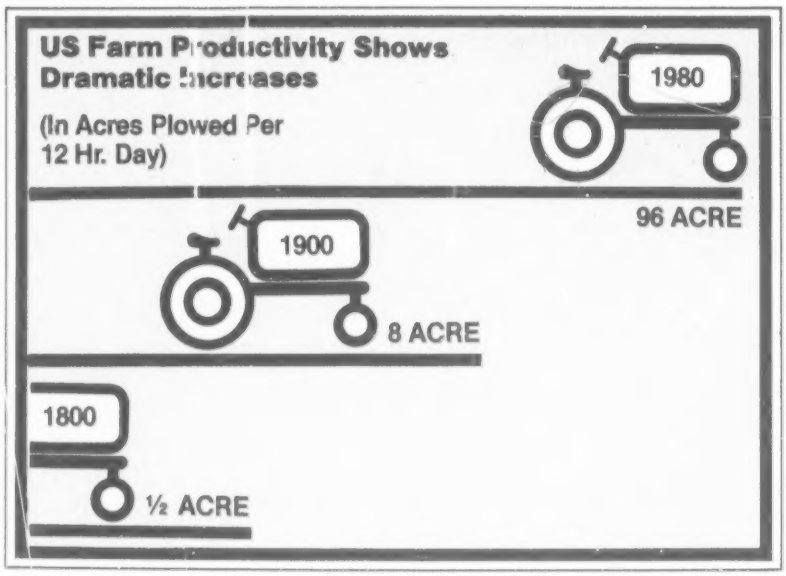
Lien says one problem of large sized units is in changing work areas. "Even in the huge fields of the Dakotas, taking down and setting up in a new field mitigates against the efficiencies of increased horsepower," says Lien. "Set-up time exceeds plowing time."

Lien points to two sets of factors important in the future. He says operators are demanding more comfort features. Seat selection and ride are becoming increasingly important as well as air condition—heating and dust-free air.

There will be additional technical features, too. "The operator wants to know operating pressures and flow," says Lien. "For example, checking hydraulic demands, such as running low horsepower hydraulic motors for air seeders. Everyone is interested in monitoring both engines and operating factors.

"However, the OEM has two ways of looking at monitoring. Either the tractor's monitoring system is designed to tell everything and let the driver decide. Or, the OEM can strive for inherent balance in design. He selects and tells only critical things such as engine condition, and then 'designs in' the rest of the variables."

William J. Howard, executive engineer for advanced engineering, Ford Tractor Operations, explains Ford's use of front wheel assist instead of four wheel drive for wet solid conditions.



"Design at Ford Tractor has two areas of activity—economics and farm practices. For large scale farming the US has historically used dual rear wheels. This led to the four-wheel-drive tractor, the second evolution of which has improved steering angles, close to two-wheel-drive capability."

But there is a labor cost in adding dual tires to meet various farming conditions.

"Minimizing heavy tillage is what current farming is all about," says Howard. "This may lead to a trend away from the big tractors. Large planting equipment may be scaled down as chemical weed control and crop rotation are used with conservation tillage."

Howard claims telescoping planters and such equipment could meet the need for movement between the fields. But he emphasizes major attention must be given to hitch systems.

Howard says comfort features may have plateaued while noise level reduction in cabs may be expected to continue due to competitive pressures and to meet the conditions of the world market.

Controls are an area of innovation. "The new hydraulic electronic devices show a trend towards more sophistication in controls," Howard states. "The effect of microprocessors is being felt daily.

"But tractors are not aircraft, therefore the changes in electronics proceed more slowly. From levers to switches is an easy jump, but from hydraulics to solid state electronics can be a problem. Redundancy of systems becomes a trend. We have to insure reliability."

If electronics proliferate, what happens when the tractor breaks down in the field—would you need an electronics expert to fix it?

Howard says that's why replaceable, plug-in modules will become important. He emphasizes the industry has to be cautious about such applications.

Roy W. Uelner, executive vice president for agri-equipment at Allis Chalmers and FIEI past president, states the whole economy is in transition.

"Realistically we must reduce costs and become more effective," says Uelner. "This may lead to reduction in horsepower requirements, such as in using the A-C front wheel assist instead of four wheel drive. That would enable a tractor to do 20-25% more work without increasing horsepower.

"We are in a stage of conservation of resources, including changing our tillage practices and the types of tillage equipment." Design changes initiated 6-8 years ago are now incorporated in new model tractors. So decisions being made right now for the next generation of agricultural tractors, will likely wait until the late '80s to appear down on the farm. ■

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Chilton's

TRUCK & OFF-HIGHWAY INDUSTRIES

JULY/AUGUST 1982

C2150-5

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Changes Fast And Furious At IH

Will Military Vehicles Meet The CHALLENGE?

Also

Forklift Leasing Picks Up

H-D Truck Designs Hit The Wind Tunnel

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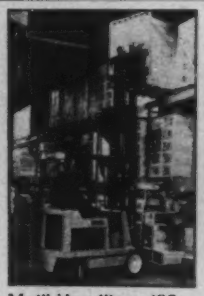

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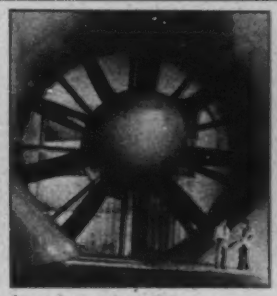

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Featured are the latest designs in military vehicles and the latest twist in lift truck sales.

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The September/October issue brings you *TOHI's* Supplier Spotlight with profiles of the heavy-duty industry's top suppliers.

abc TRUCK AND OFF-HIGHWAY !NDUSTRIES (ISSN 0194-1410/82) magazine is published bi-monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States—$30.00 per year, $55.00 for 2 years; Canada and Foreign—$60.00 per year, 2 years $110.00. Air rates on request. Single copies and back issues on request. All Subscription orders must be accompanied by cash or check along with complete information for classification, including title of the individual and the product the company manufactures. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to TRUCK AND OFF-HIGHWAY INDUSTRIES, P.O. BOX 2055, Radnor, PA 19089. ©Chilton Company, 1982. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0194-1410/82 $1.00 + 25¢)

Oil Crisis: Half The Picture?

TV is the main conduit of news for two-thirds of the public, according to a Roper Poll. TV is also considered more believable than newspapers by a 2-1 margin.

The Media Institute, a nonprofit research group, decided to take a hard look at how the networks covered the '73-'74 and '78-'79 oil crises. It made a computerized study of over 39 hours of coverage comprising 1462 stories about the events that profoundly altered American life and dealt the auto and truck industries devastating blows.

The Washington, D.C.-based Institute wants to improve the level and quality of media coverage of business and economic affairs. It found plenty of room for network improvement in its published study, "TV Coverage of the Oil Crises: How Well Was The Public Served?"

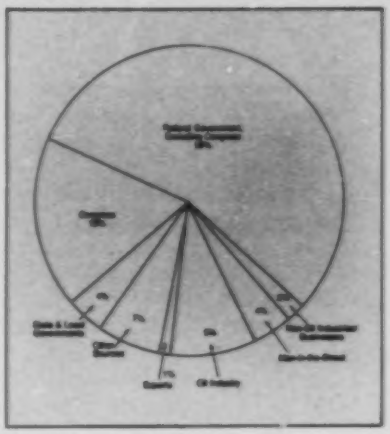
The answer is, not well at all. Consider these findings.

● "Nonmarket solutions to the oil crises such as conservation, rationing, regulation and price controls received three times the coverage that market solutions did—63% to 21%.

● "Only 15% of all solutions discussed dealt with the major policy issue of regulation and price controls vs. deregulation and decontrol."

The Institute says "It is significant that coverage of deregulation and decontrol received increased only when the administration endorsed these measures." It also pointed out that all the networks carried a consumer advocate denouncing President Carter's decision to decontrol as "the most inflationary and anti-consumer decision in this century."

● "Price was depicted as a problem rather than as a possible solution." The Institute cites the example of Ralph Nader being interviewed. "I think it is an energy crisis for consumers who are being subjected to billions of dollars of unarmed robbery by the oil companies in collusion with government support," raged Nader.



This chart, supplied by The Media Institute, depicts the breakdown of sources used by the media in its investigation of possible solutions to the oil crises. 100% equals 1645 identifiable sources, with unattributed sources excluded. (Unidentifiable sources accounted for 235 solutions, or 12% of solutions discussed.)

● "The largest single source of information overall was the government—56%. By contrast, outside experts were the source of information only 2% of the time," the study said.

Interestingly, in a previous Institute study on television coverage of inflation during '78-'79, government was the source in 77% of the stories, and government was not blamed for inflation in 77% of the broadcasts.

Government was also the source for 77% of stories on solutions to the crises. The oil industry was called on only 9% of the time.

"The government's dominance of the discussion of solutions actually increased in the second crisis, rising from 73% of all identifiable sources to 82%. . . . The oil industry was largely cut out of the discussion of solutions in the second crisis. It was the source of 11% of all solutions in the first crisis, and only 6% in the second," the study said.

The Institute also found that service station operators made up 24% of the "oil industry" interviewed. It points to an interview with a Pittsburgh operator who said, "I think there's a lot of gas out there, but I think they just want to get the price up. I think once the prices are up, there will be all the gas we can handle." The Institute says the viewer was left to wonder whether this was a solution or some kind of devious ploy on the part of the oil companies.

● "The networks identified government as a possible cause of the crises in only 18% of discussions of causes. By contrast, the networks identified OPEC and the oil industry as possible causes of the crises 72% of the time.

● "Fully 25% of all causes discussed blamed the oil industry for perpetrating a hoax, profiteering, withholding supplies or other devious actions."

The Institute says the above findings raise "very disturbing questions" about the network's coverage of what it calls "the foremost public policy issue of the 1970's."

It concludes that "network coverage failed to give the viewing public sufficient information to make an informed judgment about the oil crises. This failure stemmed from two principal and interrelated shortcomings in the networks' coverage—failure to present adequately the economic dimension of the crises, and an overwhelming preference for government sources of information rather than outside experts."

The Institute contends "The result was a distorted picture in which certain solutions became the focus of discussion, and in effect became the limit of the debate. Price mechanisms, which many economists and outside energy experts even then were discussing as the solution, were left out of that debate for the most part.

"The public, then, was led to believe that half the picture was in fact the whole picture," the Institute says.

That's an interesting premise to keep in mind the next time you turn on the tube. ■

—Paula D. Hodges

Rexnord Sells CE Business

Rexnord Inc. is selling its Milwaukee construction business to an employee group headed by James H. Stollenwerk, president of the firm's Construction Machinery Div.

The newly formed company, Rexworks, will manufacture concrete plants and controls, concrete mixers, sanitary landfill compactors and other compaction and stabilization equipment. About 200 people are employed at its plant.

Divestiture of the construction machinery business fits into Rexnord's long-range objectives, R. V. Krikorian, chairman and CEO says. "In former years this business accounted for as much as one-third of our sales," he says. "As other segments of our business have grown, however, construction machinery now accounts for less than 5%." Rexnord 1981 sales were $1.13 billion. ■

Key Indicators

Selected Construction Equip., Producers' Shipments, 4th Quarter* $1,188,215,000

— Units —	April '82	April '81	Year to Date 1982	Year to Date 1981
New Housing Starts (Actual)	84,200	123,000	—	—
US Total Truck Factory Sales (Classes 3-8)	15,984	22,671	60,589	81,662
US New Car Production	487,814	649,808	1,558,747	2,203,777
Farm Machinery, US / Retail Sales				
2wd Farm Tractors, Over 40 hp	7,510	10,804	26,368	31,213
4wd Farm Tractors, Total	777	1,091	2,704	3,410
Self-Propelled Combines	590	920	2,960	4,739

Construction, Mining & Materials-Handling Equip. Manufacturing**	April '82	March '82	Year to Date '82	Year to Date '81
New Orders	$ 2.0	$ 2.5	$10.9	$14.9
Shipments	2.9	3.1	12.9	13.1
Inventories	10.3	10.0	—	—
Unfilled Orders	18.1	18.4	—	—
Manufacturers Value of Shipments**				
Primary Metals, Total	$ 9.0	$ 8.9	$39.3	$48.6
Steel	4.3	4.3	19.6	24.7
Nonferrous Metal	3.8	3.6	15.9	19.2
Nonelectrical Machinery Equip. Industries, Total	15.5	16.4	65.9	67.7
Engines & Turbines	1.3	1.2	5.4	5.5
Farm Machinery & Equip.	.9	.9	4.1	5.3
Metalworking Machinery	.8	.9	3.8	4.0
General Industrial Machinery	1.2	1.4	5.4	5.5
Transportation Equip. Industry, Total	18.0	17.0	68.5	73.6
Motor Vehicle & Parts	11.8	10.3	43.1	46.8
Fluid Power Equip. (Index 1972 = 100)	237.0	239.0	—	—
Machine Tools***				
Net New Orders	$ .1	$ .1	$ .6	$ 1.2
Shipments	.3	.4	1.4	1.7

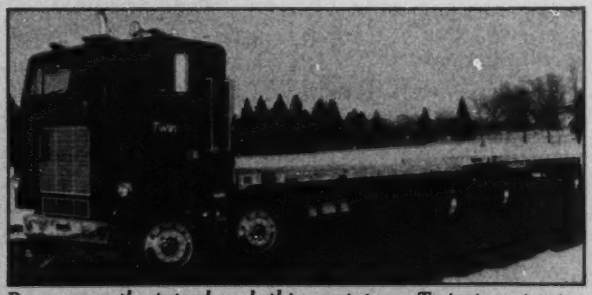
*Not seasonally adjusted, includes off-highway wheel tractors, mixers, pavers, wheel loaders, scrapers, graders, rollers, off-highway equip., and mountings.
**Billions of dollars, seasonally adjusted monthly total (unless otherwise noted).
***Cutting and forming, domestic and foreign.

Sources: US Dept. of Commerce, Individual Motor Vehicle Mfgrs., National Fluid Power Assn., NMTBA, FIEI, TOHI.

New Rig Handles 25% More Load

A prototype of a super lightweight truck and trailer combination was introduced by Ruan, Des Moines, IA, at the recent Private Truck Council of America (PTCA) meeting in Chicago. It is claimed to have 25% more capacity for high density cargoes.

The "Twinsteer" tractor has tandem front steerable axles and a mostly aluminum cab and chassis. Combined rig tare weight is only 20,880 lb (947 kg). It is powered by a DDA 6V-92TTA engine and uses a 10-speed Spicer 1310-4A transmission.



Ruan recently introduced this prototype Twinsteer tractor with tandem front steerable axles and a mostly aluminum cab and chassis.

The Freightliner-built tractor and Fruehauf trailer were specially engineered and built to Ruan specifications. An International Harvester version will also be available.

William L. Giles, head of Ruan's corporate engineering staff, guided Freightliner and Fruehauf efforts to stay within the federally approved bridge load limit. The formula allows 80,000 lb (36,228 kg) distributed over five axles.

Ruan is a contract carrier and truck lessor as well as a marketer of the Twinsteer and other heavy trucks. ■

Eaton Ready For Business Comeback

"We're convinced that our core businesses will come back very strong," Eaton president James R. Stover told shareholders at his com-

(Continued)

Materials Handling Outlook:

Leasing Takes Bigger Chunk Of Down Market

No longer is 'sales' a simple task in a simple world. The uses of capital are changing so that leasing may become the major way of transferring both use and title of materials handling equipment.

by John Forwalter

According to industry leaders, 1982 will be the third year in a materials handling industry slump.

While the majority of corporate executives contacted still say the last half of 1982 will see increased shipments, there is no sign of this upswing as yet. It is the general industry belief, that, as a mature industry, materials handling rises and falls with general economic conditions. TOHI found two trends that may significantly change this perception.

Leasing is increasingly a way of offsetting direct sales of industrial trucks. The leasing trend is up 20% annually, even in a three year recession, according to a lessor association. The reason, according to J. P. Greer, vice president of Hyster's US Industrial Truck Div., is that "there

(Continued)

Materials Handling Outlook

has been a considerable shift in the mind of the user as to how to use capital dollars."

Those equipment OEMs that don't have leasing departments are adding them to their financial armories. In light of continuing high interest rates, leasing *is* sales with a new name.

The second major trend that affects long-term sales and utilization of manned, wheeled materials handling equipment is systems installations. With major OEMs buying systems groups and more creating them, materials handling systems will cut deeply into sales of fleets of forklift trucks during the decade.

As Hyster's Greer says, "It is not a matter of forklifts or automated systems. The two types will always be used together by our customers."

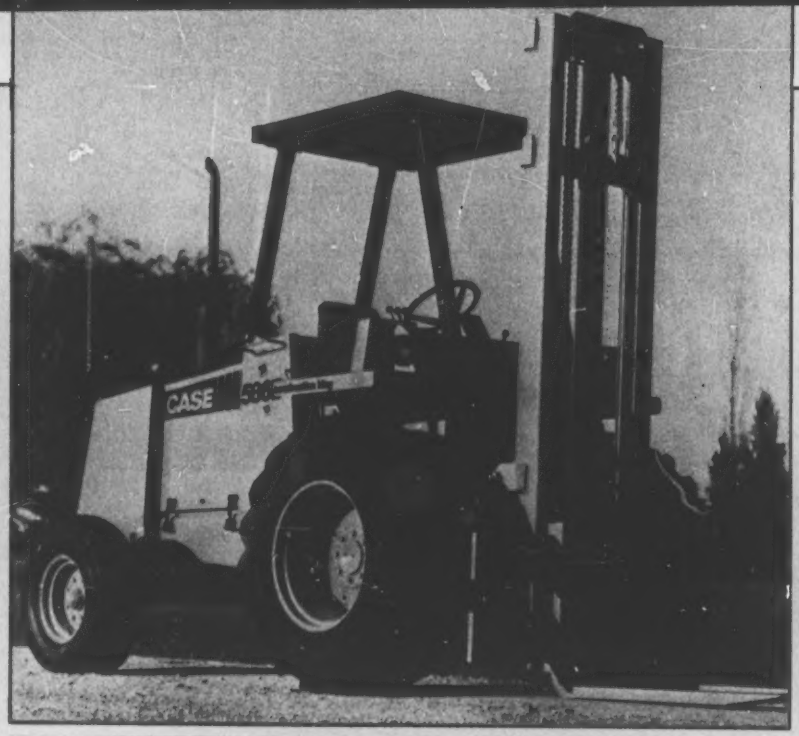
A third industry trend is the introduction of simple, but reliable materials handling vehicles by US OEMs in an effort to battle the foreign economy models. A surprising addition to this effort this year was 'Cadillac' Hyster's introduction of an economy 4000- through 6000-lb (1814- to 2722-kg) capacity series of pneumatic riders with internal combustion power. "This is a pretty significant departure for Hyster," says Greer.

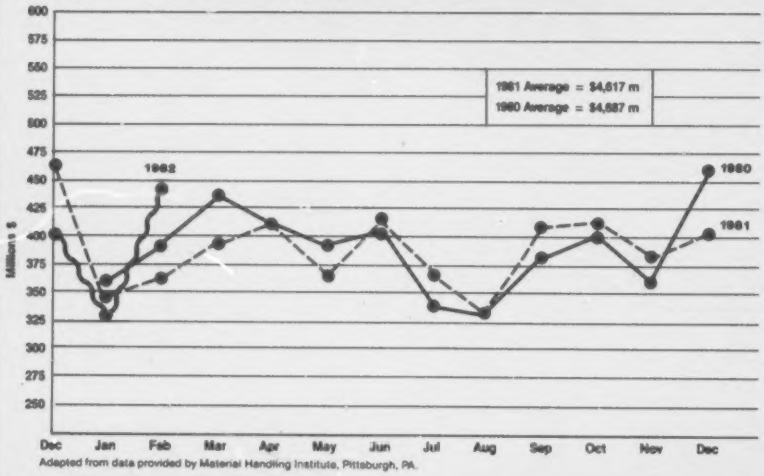
Still, Dept. of Commerce numbers for 1981 show imports only taking 10% of the market.

An Eaton Corp. spokesman best sums up the overall situation of the materials handling industry. "It is clear that there is a great excess of productive capacity in the industry," he says. "Long range projections do not indicate a return to the level the industry realized in the early '70s.

"Eaton recognized this fact and has, over the past 15 months, substantially reduced its manufacturing capacity to bring it in line with projected demand," he says. "Other companies are now trying to do the same."

On the trend toward leasing, the Eaton spokesman asserts, "Many companies have found that leasing





Adapted from data provided by Material Handling Institute, Pittsburgh, PA.

MAJOR EXPORT MARKETS IN 1981

	(in $ millions)
Canada	90.6
Mexico	53.1
W. Germany	25.3
U.K.	32.9
Saudi Arabia	31.7
Australia	29.1
S. Africa	16.0

industrial trucks allows them to obtain the new equipment they need while not diminishing precious capital reserves. In the long run, leasing makes possible investment in new product development and productivity improvements."

Caterpillar Tractor Co., Peoria, IL, began its leasing venture just this year. "It's just in its infancy," says a Caterpillar spokesman. "We really haven't had enough experience with it to say we did this or do that."

Wayne R. Burnette, president and general manager of Clark Rental Co., Battlecreek, MI, sees a big future in leasing. "Leasing has been and will continue to be one of the most viable alternatives for many companies in acquiring materials handling equipment without immediate capital expenditure.

"In the final analysis it is the rec-

ognition [by users] that turning a lifttruck fleet over to specialists makes sense from the standpoint of reducing downtime, improving utilization and lowering costs. Since Clark pioneered the rental concept in the lifttruck industry more than 25 years ago it has witnessed continued growth in this area of business year after year for the past decade. An increasingly significant percentage of Clark's total factory orders may be attributed to some form of rental or leasing arrangement.

"Our business has historically been cyclical. The rebound for the latest downturn, however, has not been fast coming. Yet rental and leasing are still holding their own, at least for Clark."

Hyster's Greer notes that "for a decade, leasing has been a growing trend at Hyster. There has been increasing activity lately due to high borrowing costs.

"The powered industrial truck industry is accurately described as a mature industry today," Greer continues." We will not experience that growth . . . that we have been accustomed to since World War II.

"In other segments of the industry, growth can be expected. Automation is becoming more prevalent. Those of us in the industrial truck business, who have an interest in the automation of materials handling will in the future be 'mixed' business people. Hyster is moving aggressively into this area."

In April, Hyster announced its entry into the automated materials handling field. According to Hyster board chairman W. H. Kilkenny, automated storage and retrieval systems, automatic horizontal transportation, materials handling robots and automatic guidance and control segments are forecast to grow at rates ot 16-25% annually over the next 10 years.

Making any major inroads in foreign markets seems unlikely, Greer says. Canada's industrial truck market is also 'mature' and Mexico's market is restricted, he says. As to the developing countries, Greer claims, "Hyster has been a part of developing most of the world markets." Still exports in 1981 were up 3.6% over 1980 for the industry.

One bright spot in industrial trucks is the sales of rough terrain forklifts. Case's William Seidel, product marketing supervisor of motor, backhoe and forklift sales, indicates that oil exploration activities have kept rough terrain sales up for his company.

Surprisingly, with all of this upheaval in the marketplace, Hyster's Greer does *not* see any further shakedown in companies. "The number of companies continues to be about the same," he says. "As for market share, there are some winners and some losers in times like this." ■

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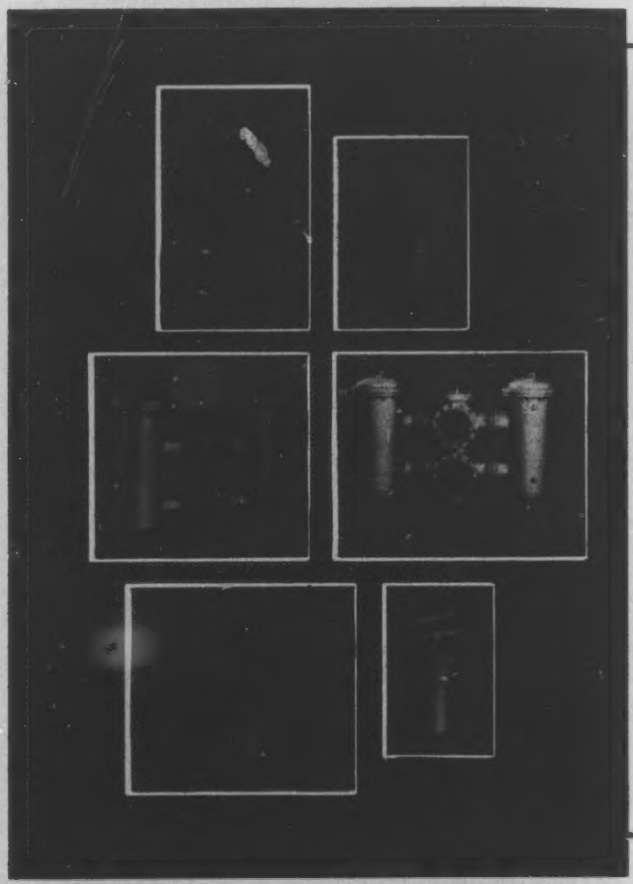

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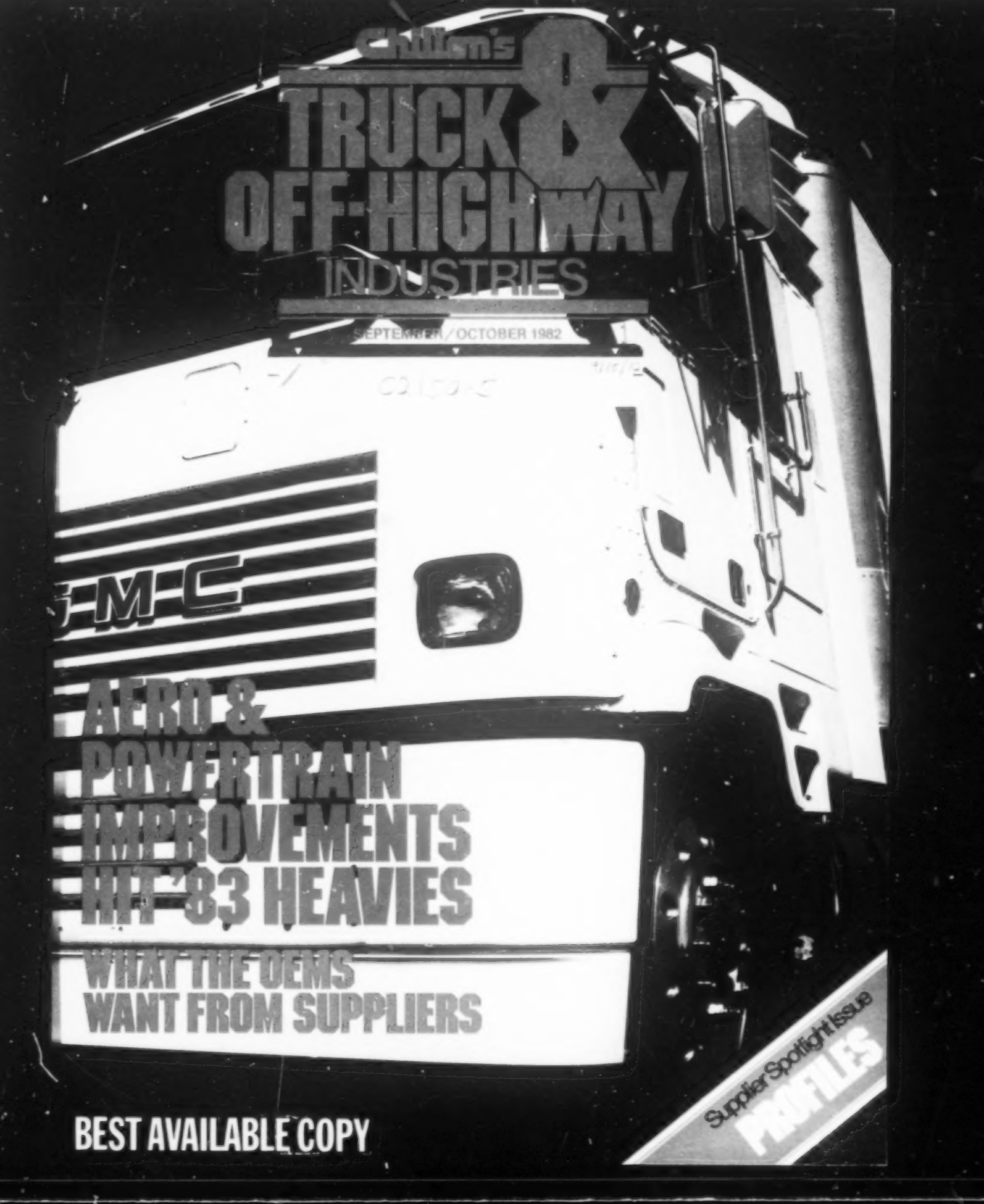

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September/October, 1982

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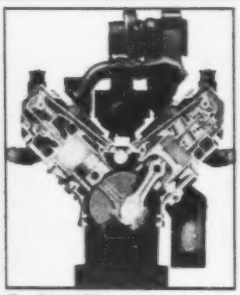

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COVER

GMC's aerodynamic Aero Astro slips through the air onto the HD scene.

NEXT ISSUE

The November/December issue features heavy-duty specs, a report on a special forging conference and a look at fasteners.

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Key Indicators

Selected Construction Equip., Producers' Shipments, 1st Quarter* $909,497,000

— Units —	June '82	June '81	Year to Date 1982	Year to Date 1981
New Housing Starts (Actual)	91,300	105,800	451,200	602,900
US Total Truck Factory Sales (Classes 3-8)	15,823	21,557	91,070	123,915
US New Car Production	564,308	708,029	2,636,883	3,573,797
Farm Machinery, US / Retail Sales				
2wd Farm Tractors, Over 40 hp	6,307	7,445	37,603	46,728
4wd Farm Tractors, Total	509	662	3,771	4,750
Self-Propelled Combines	1,092	1,799	4,649	7,713

Construction, Mining & Materials-Handling Equip. Manufacturing**	June '82	May '82	Year to Date '82	Year to Date '81
New Orders	$ 2.5	$ 2.3	$14.9	$21.1
Shipments	3.0	2.8	18.2	18.9
Inventories	11.1	11.4	9.5	9.4
Unfilled Orders	7.4	7.8	10.6	10.5
Manufacturers Value of Shipments**				
Primary Metals, Total	$ 8.7	$ 8.7	$56.9	$72.9
Steel	4.0	3.9	27.2	36.7
Nonferrous Metal	3.8	3.9	24.2	29.3
Nonelectrical Machinery Equip. Industries, Total	15.3	15.9	97.5	102.4
Engines & Turbines	1.1	1.2	7.8	8.2
Farm Machinery & Equip.	1.0	1.1	6.8	8.9
Metalworking Machinery	.9	.9	5.7	6.2
General Industrial Machinery	1.1	1.3	8.0	8.5
Transportation Equip. Industry, Total	17.6	17.2	99.5	106.6
Motor Vehicle & Parts	10.4	10.0	57.7	62.4
Fluid Power Equip. (Index 1972 = 100)	227.0	212.0	—	--
Machine Tools***				
Net New Orders	$ 0.1	$ 0.1	$ 1.0	$ 1.8
Shipments	0.4	0.3	2.2	2.6

*Not seasonally adjusted, includes off-highway wheel tractors, mixers, pavers, wheel loaders, scrapers, graders, rollers, off-highway equip., and mountings.
**Billions of dollars, seasonally adjusted monthly total (unless otherwise noted).
***Cutting and forming, domestic and foreign.

Sources: US Dept. of Commerce, Individual Motor Vehicle Mfgrs., National Fluid Power Assn., NMTBA, FIEI, TOHI.

transfer case which Dana Corp. now produces for full-sized Ford pickups. Twin I-beam coil spring suspension will also be part of the four-wheel-drive Ranger package.

For the full-sized Ford pick-ups, a new IH 6.9-L (422-in.³) diesel engine, initially available in manual transmission models only, will be available. The engine is a product of a three-year joint venture between Ford and IH. This will mark its first application.

Ford says its $3 billion light truck development program will result in the introduction of new products every six months through 1985. Future entries will include a small Bronco for 1983½, possibly a four-passenger extended cab Ranger, a couple more diesels, a heavy-duty Ranger and a mini-van for '85. A German V-6 gasoline engine will also be made available in '83½ as a Ranger option and as standard for the small Bronco.

Chevrolet has been busy at the drawing board as well, and for 1983 will offer an expanded S-10 line including an extended cab version, a downsized Blazer, four-wheel drive availability across the board and a new 2.0-L (122-in.³) four derived from the J-car powerplant. The Blazer will be continued, although only as a four-wheel-drive unit.

The yet unchristened extended cab S-10 will offer 16 in. (406 mm) more length in the cab combined with a short bed on a 122.9-in. (3122-mm) wheelbase. The downsized S-10-based Blazer is narrower, shorter and lower than the original and according to Chevy will offer improvements in ground clearance, fuel economy and ride.

The four-wheel-drive system now available on all S-10s and new Blazers is based on a transfer case produced for Chevy by the New Process Div. of Chrysler Corp. While EPA ratings are as yet unavailable for the four-wheel-drive S-10s, highway readings of up to 27 mpg (8.7 L/100 km) have been recorded.

Chevy will offer two base engines in '83—a Chevy 2.0-L four re-engineered for longitudinal use, and an Isuzu 1.9-L (116-in.³) four. An optional 2.8-L (173-in.³) V-6 will also be available. A small diesel is planned for later in the '83 model year, coming on-board first with two-wheel-drive trucks. ■

High Solids Paint Bright Picture

EPA's possible decision to ease emissions guidelines will not affect in any way DuPont's enthusiasm for high solids paints.

DuPont's Industrial Finishes Laboratory, Philadelphia, PA, began high solids testing in 1972. At that time the goal was to develop a finishing system that would beat the impending EPA requirements.

The result of DuPont's research bore fruit in 1981 when it introduced Tufcote high solids enamel finish for the farm and industrial vehicle OEMs.

According to Michael Paparone, air-dry product marketing manager for DuPont, high solids' performance and production properties give it advantages over waterborne and powder coatings. He says that this would hold true even if EPA guidelines became non-existent.

"The economic and quality advantages of high solids products would continue to improve their competitive position in the marketplace even if the guidelines were eased," says Paparone.

Besides emitting fewer fumes than conventional fin-

(Continued)